MAY 9 1927

UNITED STATES NAVAL INSTITUTE PROCEEDINGS

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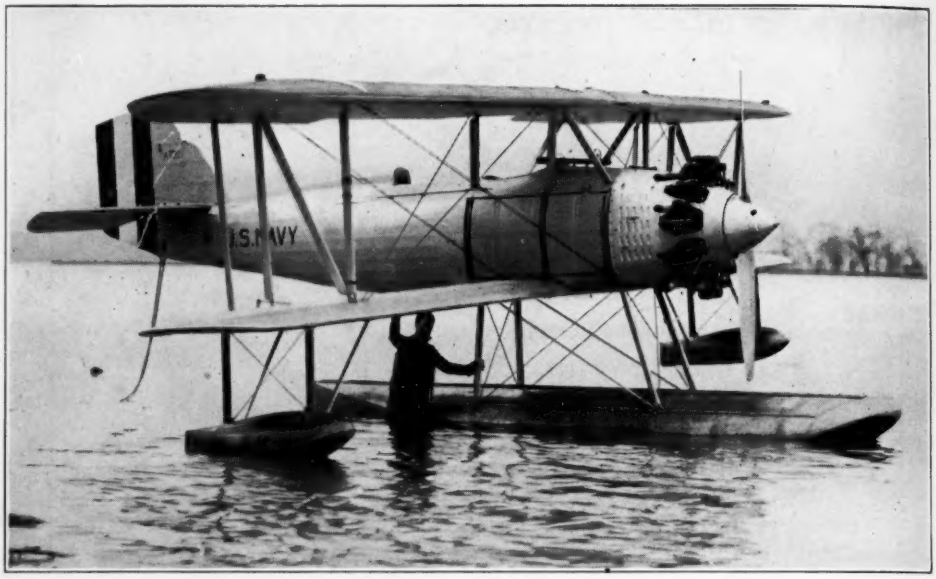

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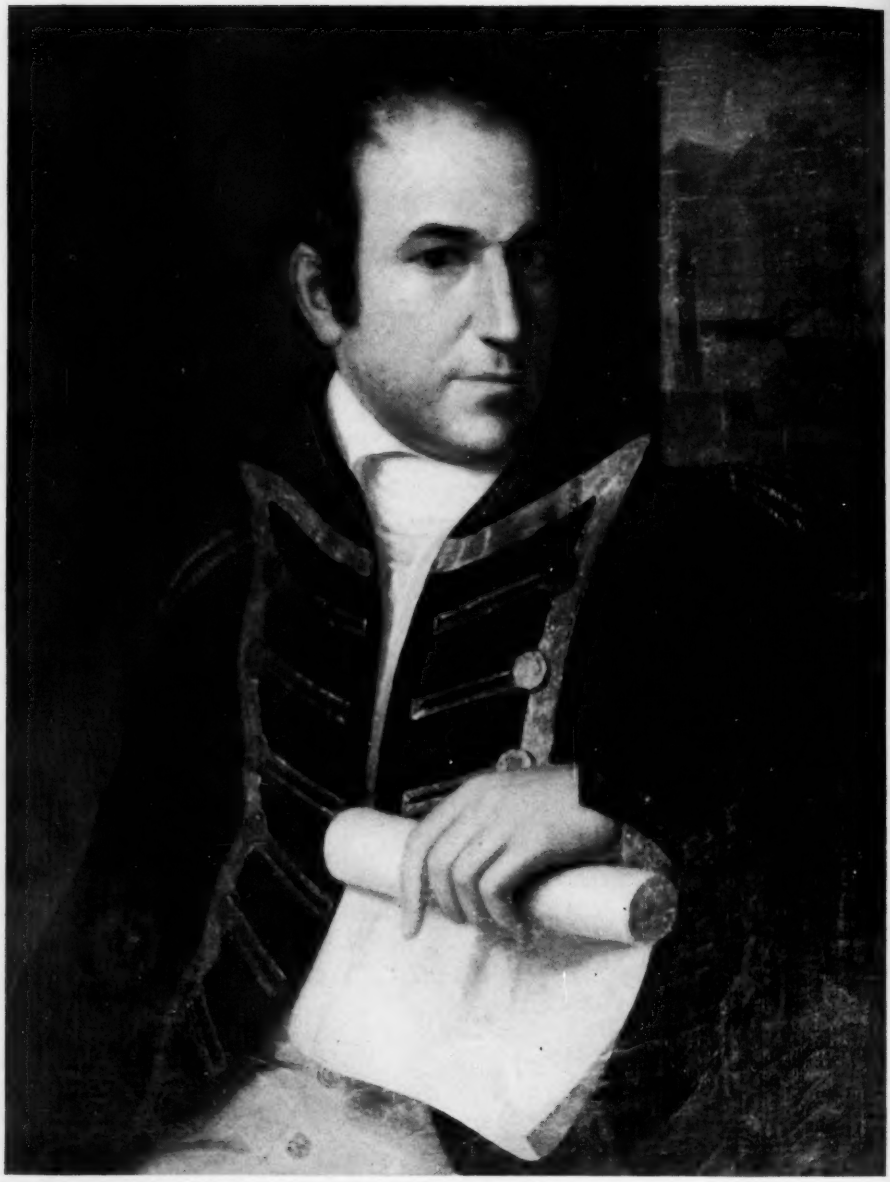
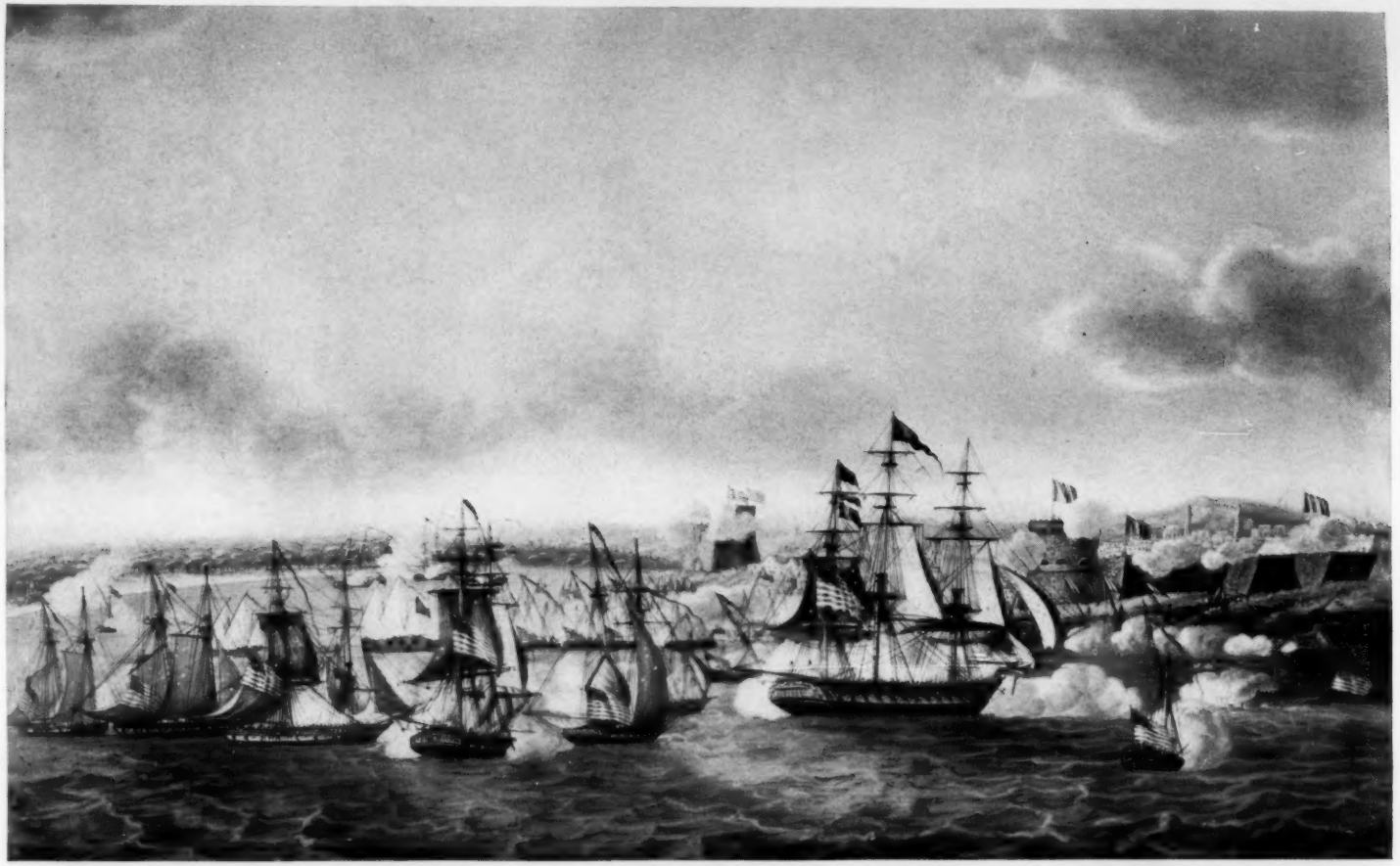
LIEUTENANT-COMMANDER NOEL DAVIS, U. S. N. R., KILLED APRIL 26, IN TEST FLIGHT PREPARING FOR A TRANSATLANTIC FLIGHT IN THE PLANE, THE "AMERICAN LEGION," BUILT BY THE KEYSTONE AIRCRAFT COMPANY TO ATTEMPT A NON-STOP NEW YORK TO PARIS FLIGHT. THE PLANE IS A STANDARD LIGHT BOMBER WITH EXTRA TANKS.



COMMODORE EDWARD PREBLE
1761-1807

Who, in 1803, with his "school boys"—Decatur, Macdonough, Hull, Lawrence, Bainbridge, Stewart, Blakeley, Chauncey, Charles Morris, David Porter, Jacob Jones, and Biddle—brought the Bey of Tripoli to terms.

—From the original by John W. Jarvis



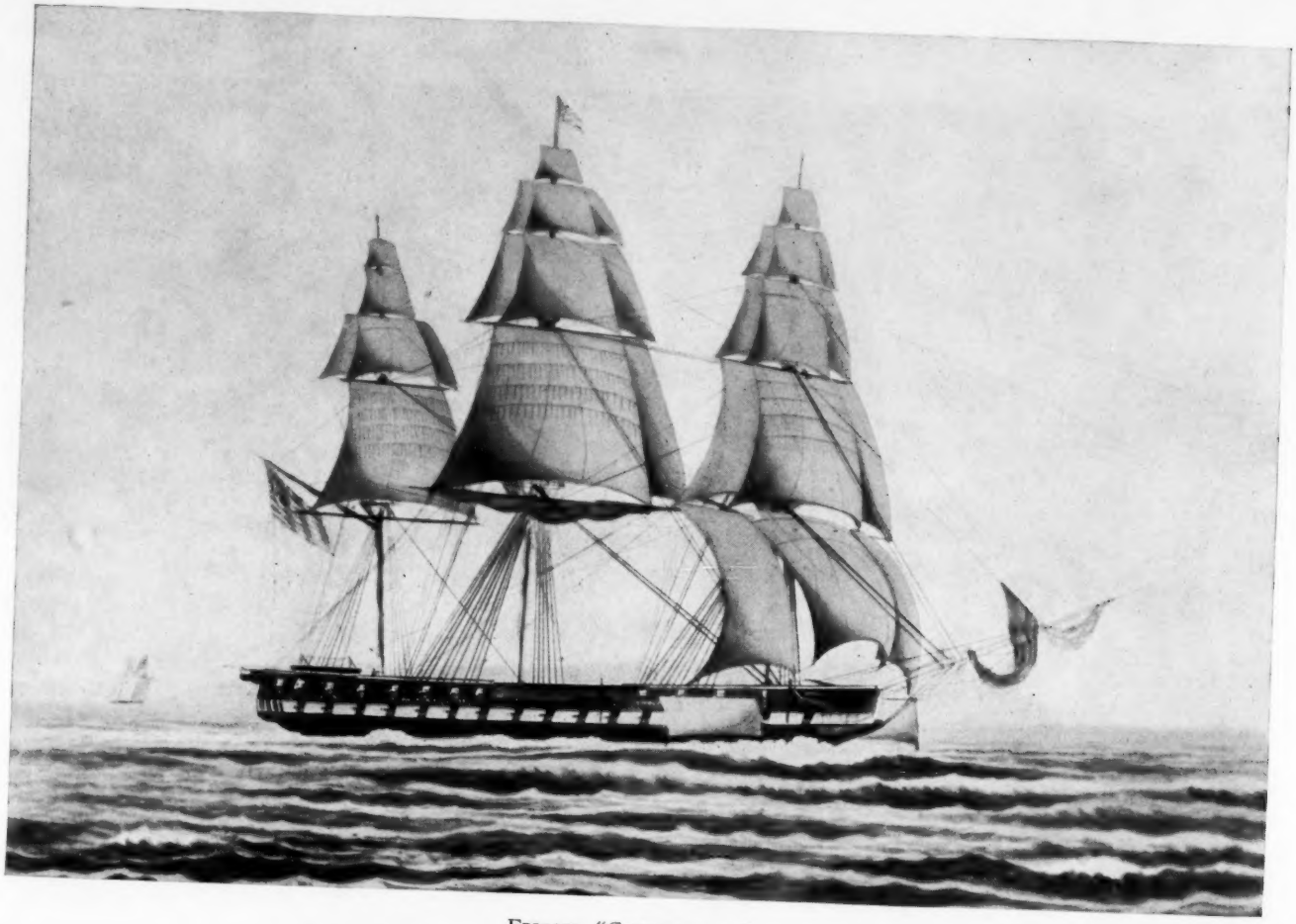
THE "CONSTITUTION" (LARGE SHIP RIGHT CENTER FOREGROUND) LEADING IN THE ATTACK ON TRIPOLI, AUGUST 3, 1804. PAINTED BY M. CARNÉ IN 1805.

COMMODORE STEPHEN DECATUR

COMMODORE STEPHEN DECATUR

This portrait by John W. Jarvis, now in Memorial Hall, was presented in 1839 by Stephen Price to the Naval Lyceum at the Brooklyn Navy Yard. It is said to be one of the most artistic portraits in the Naval Academy's Collection of oil paintings.

"Constitution"



FRIGATE "CONSTITUTION"
Capt. Wm. Boerum, bearing the Pendant of Commt. J. D. Elliott
Homeward Bound!
July, 1838

FRIGATE "CONSTITUTION"
Capt. Wm. Boerum, bearing the Pendant of Commt. J. D. Elliott
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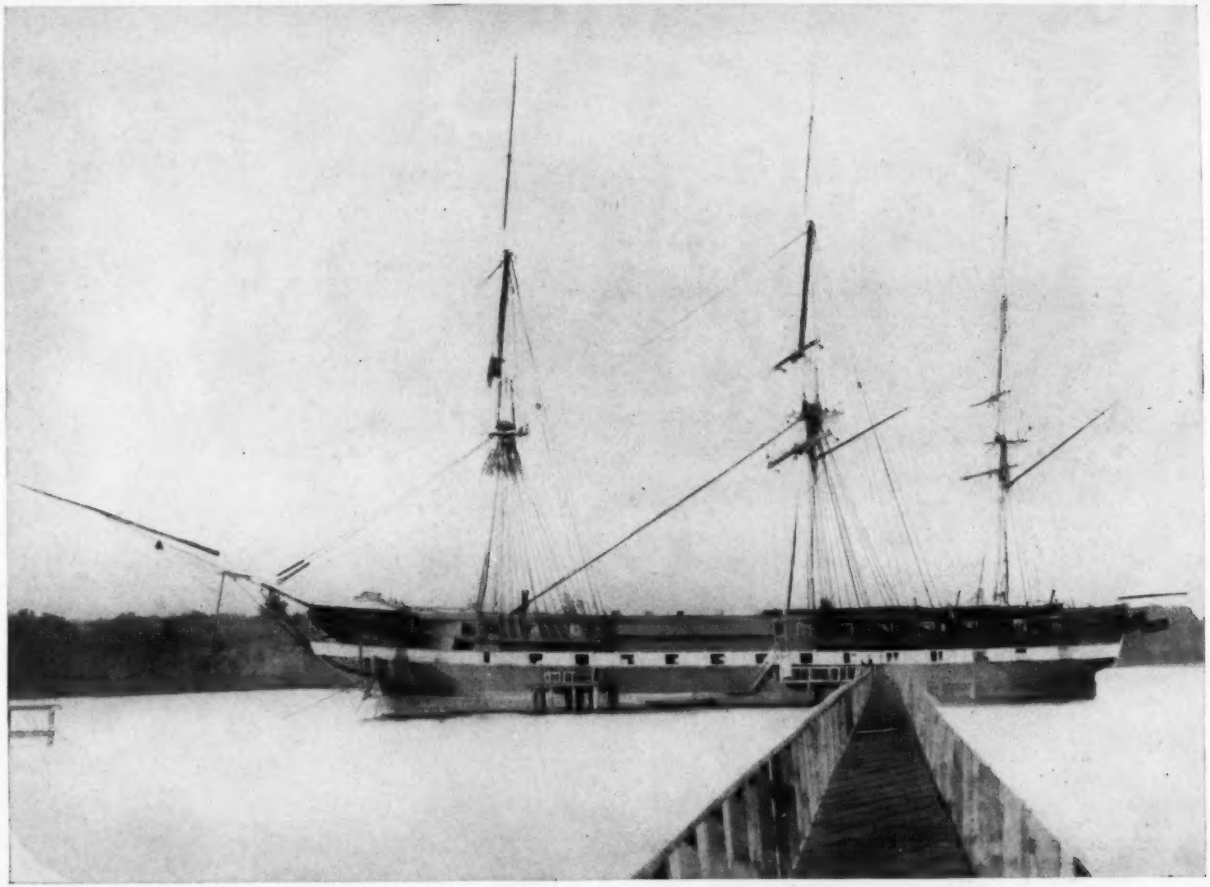

U. S. S. "CONSTITUTION" AT THE OLD NAVAL ACADEMY

U. S. Frigate "Constitution" Capt. Wm. Boerum, Rounding Elba, May 18, 1837
Presented to the U. S. Naval Academy, 1906, by William Boerum Wetmore
From a painting in his possession, made for her Captain by a sub-officer serving on the *Constitution* at the time.

U. S. Frigate "Constitution" Capt. Wm. Boerum, Rounding Elba, May 18, 1837
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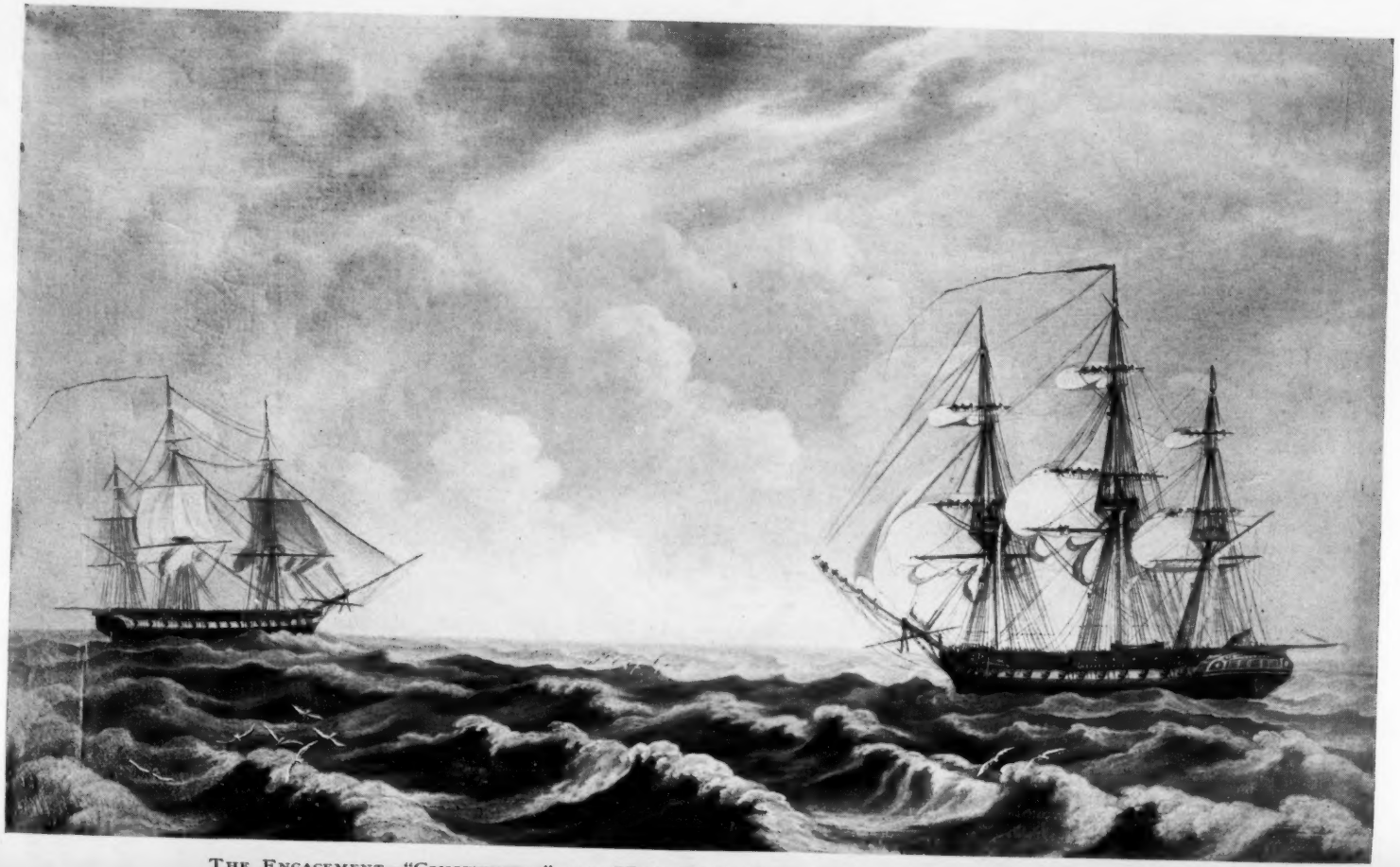
Navy Department Photo of Painting—Artist Unknown



THE ENGAGEMENT—"CONSTITUTION" AND "GUERRIERE"—FROM ORIGINAL PAINTING BY THOMAS BIRCH

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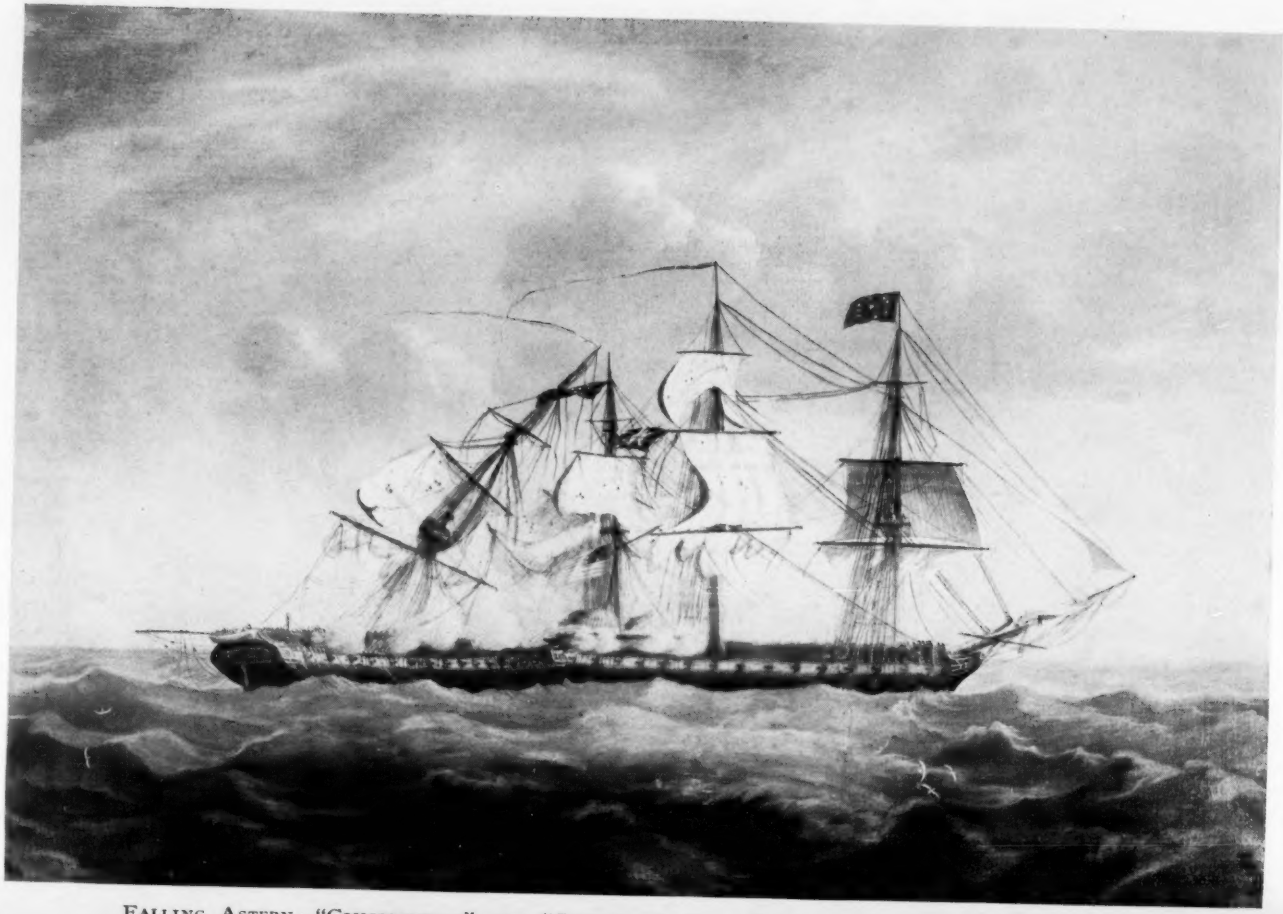
THE BATTLE—"CONSTITUTION" AND "GUERRIERE"—FROM ORIGINAL PAINTING BY THOMAS BIRCH



FALLING ASTERN—"CONSTITUTION" AND "GUERRIERE"—FROM ORIGINAL PAINTING BY THOMAS BIRCH

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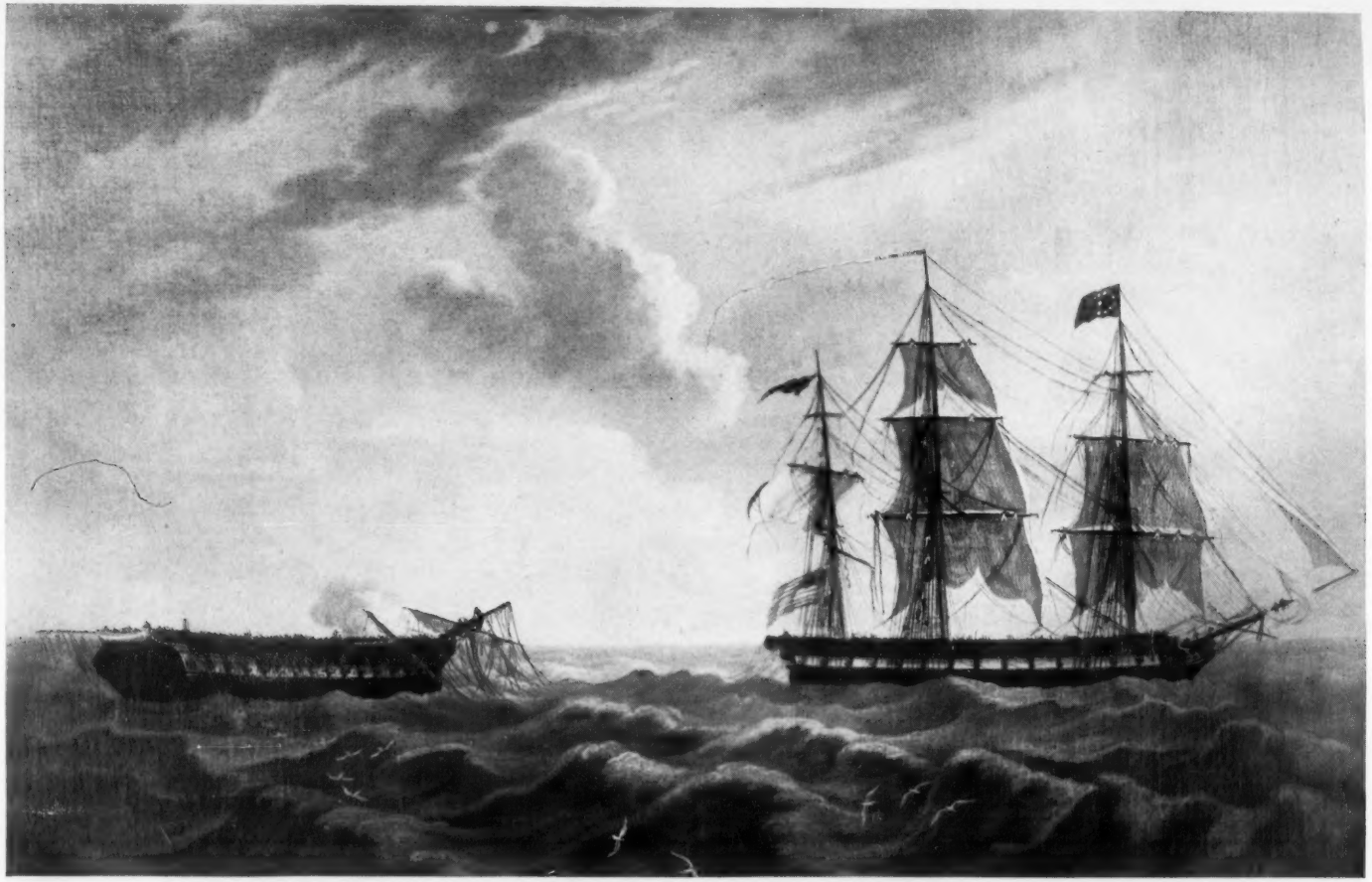
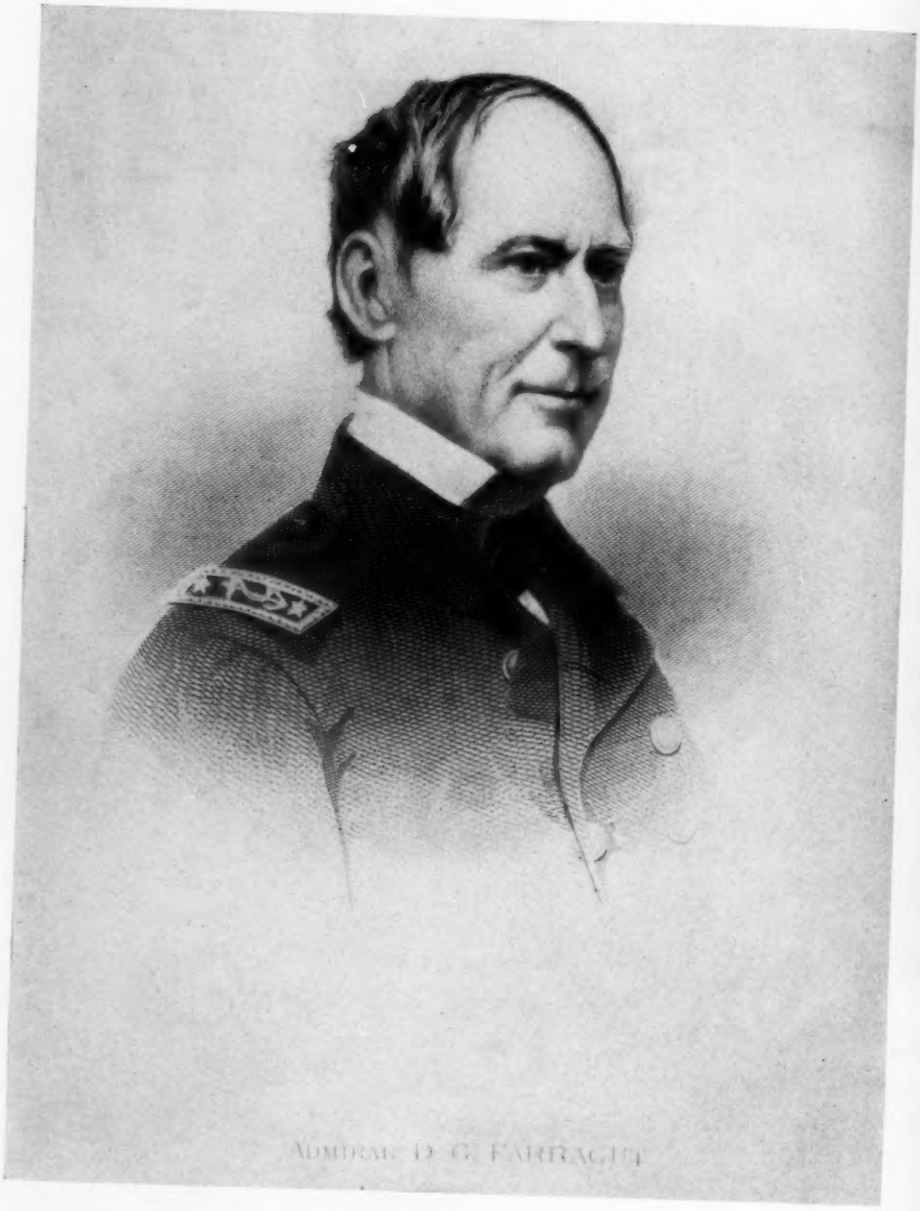
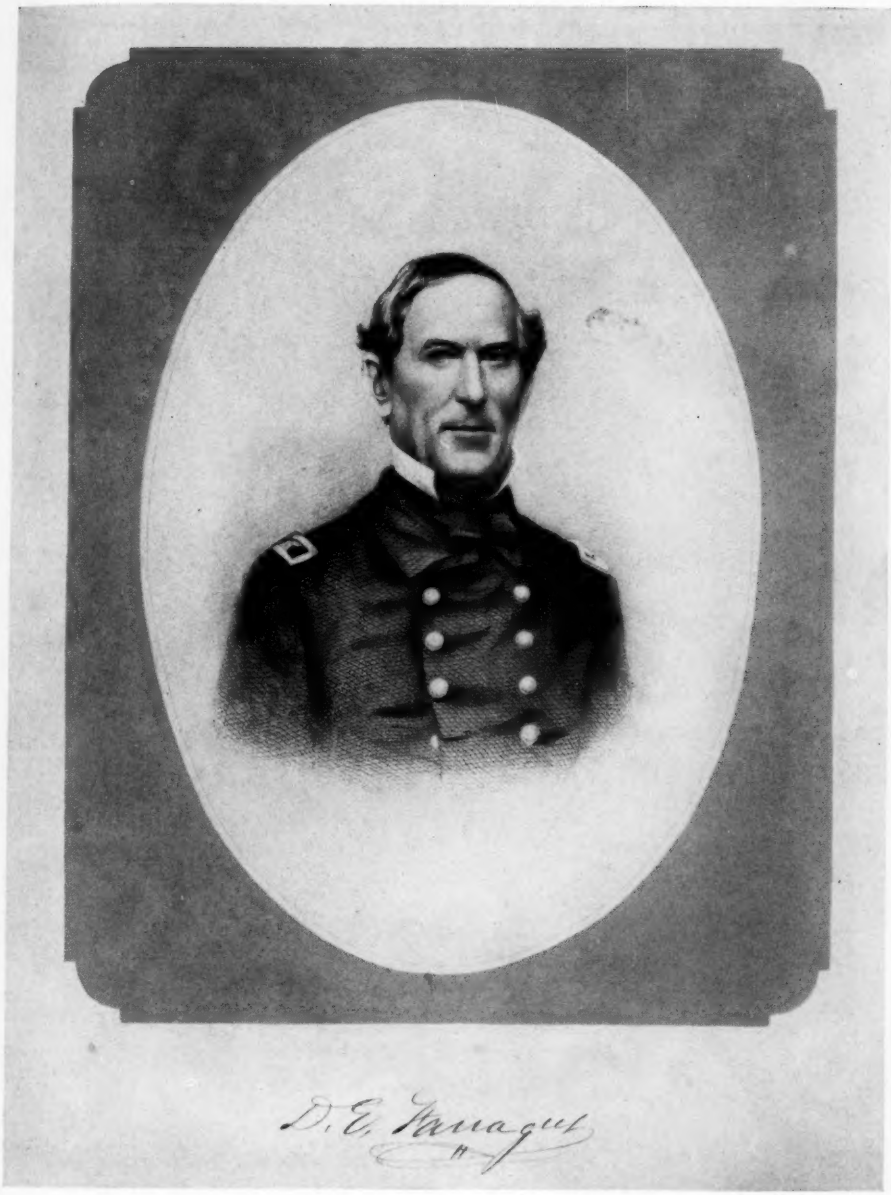


THE TOTAL WRECK—"CONSTITUTION" AND "GUERRIERE"—FROM ORIGINAL PAINTING BY THOMAS BIRCH



ADMIRAL D. G. FARRAGUT

ADMIRAL DAVID GLASGOW FARRAGUT
Engraved by A. H. Ritchie, Harbeck Collection.



DAVID GLASGOW FARRAGUT
An early portrait. Engraved by H. Wright Smith, Harbeck Collection.

DAVID GLASGOW FARRAGUT
1801-1870

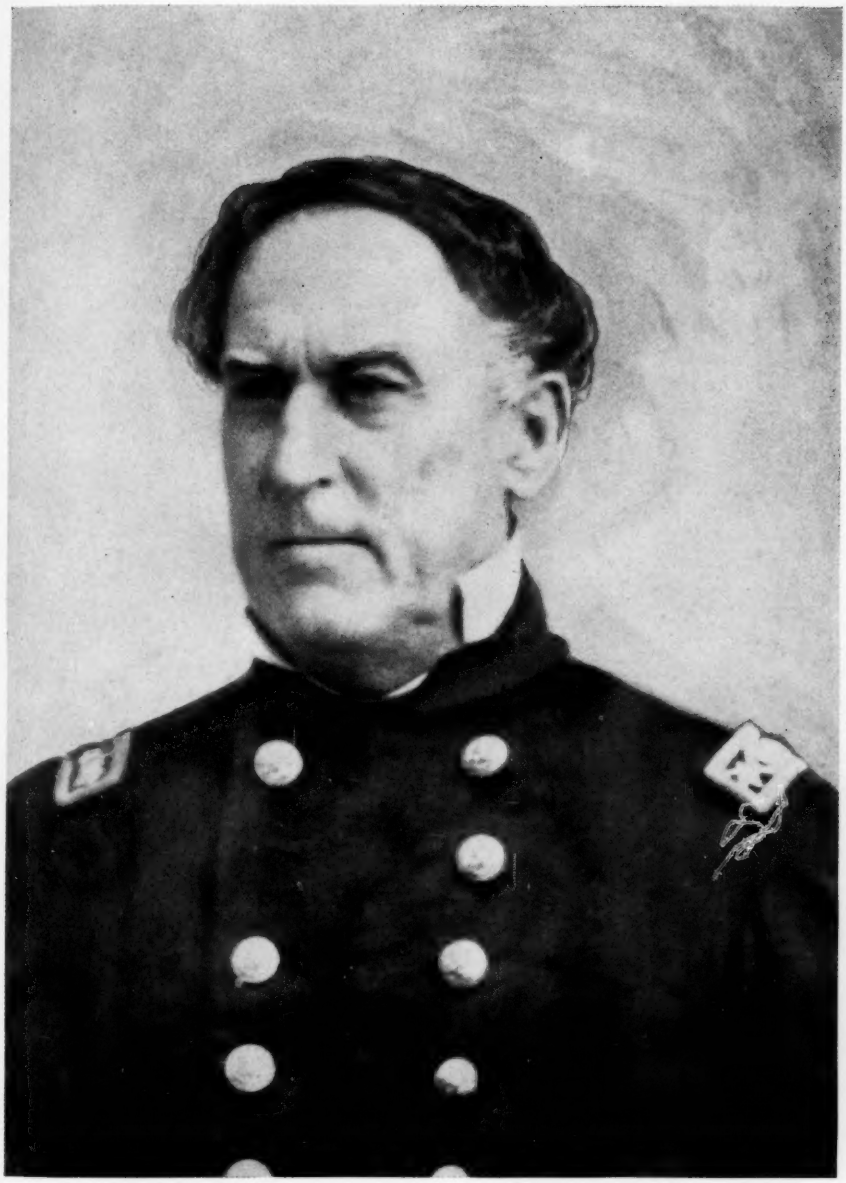
In the uniform of Admiral, the rank bestowed on him by Congress, July 25, 1866. From the photograph in the Academic Board Room, U. S. Naval Academy.

ADMIRAL DAVID GLASGOW FARRAGUT
from an autographed photograph.

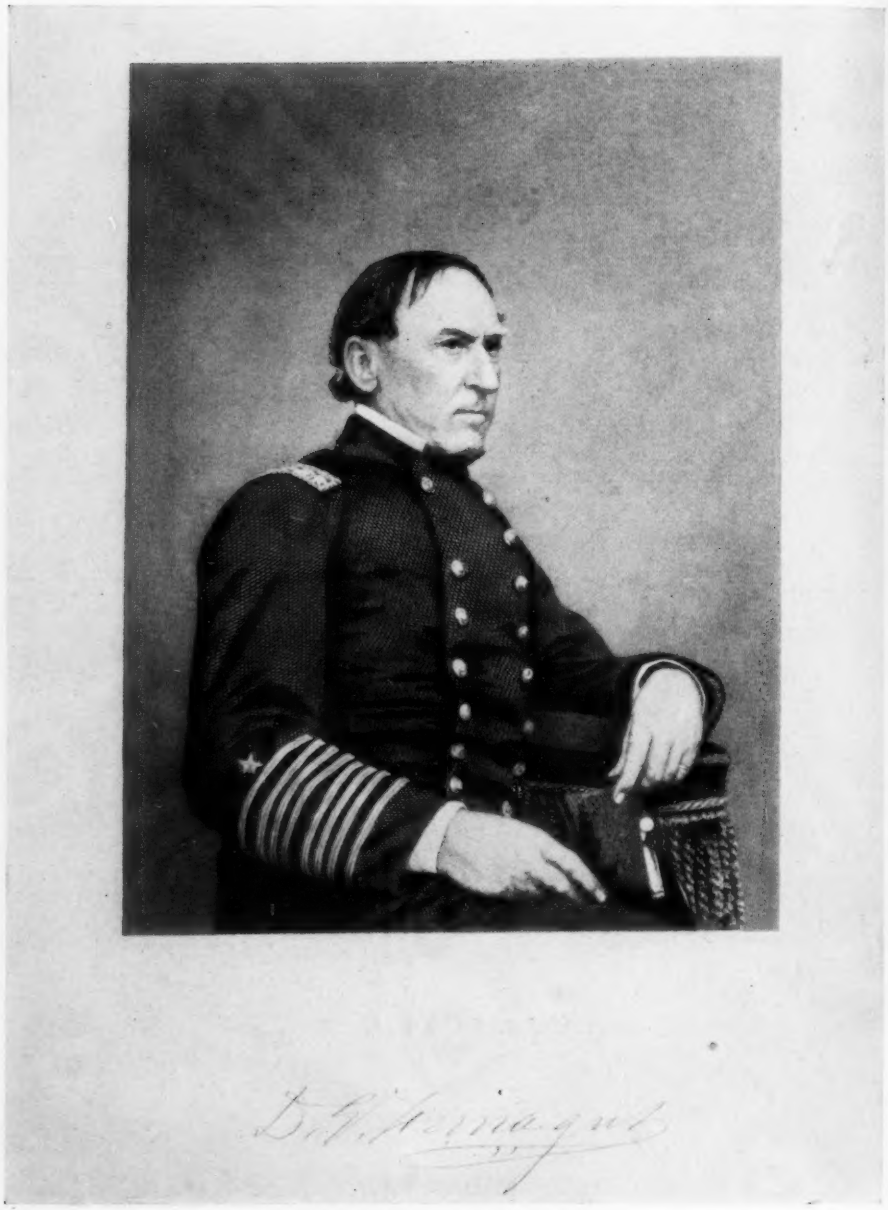
On July 25, 1866, Congress conferred upon Farragut the full rank of admiral, the first officer to hold this rank in our Navy. From a print in the Harbeck Collection.

Courtesy of E. J. Colleran, Chief Photographer, U. S. Navy.

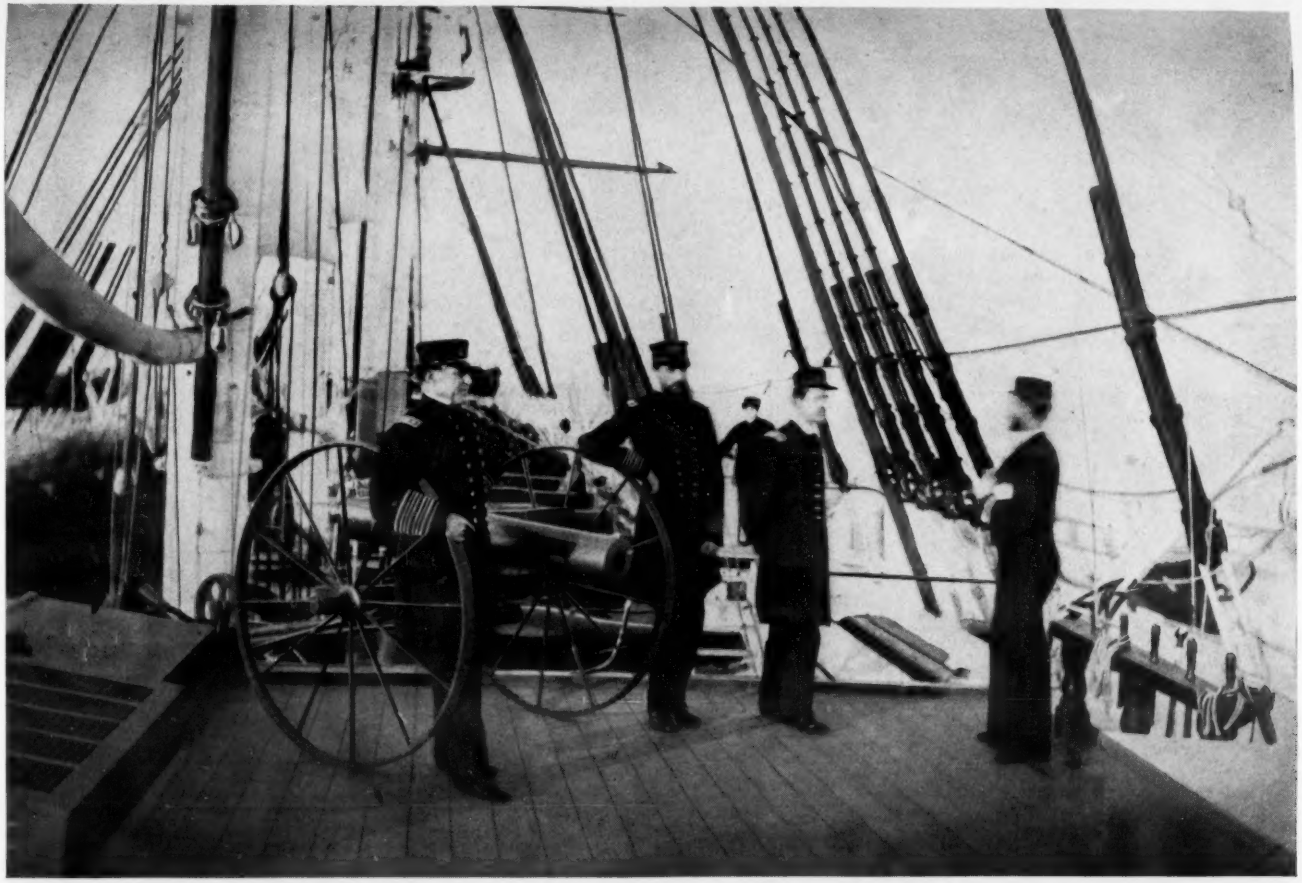
A Portion of the Farragut Window, U. S. Naval Academy Chapel



ADMIRAL DAVID GLASGOW FARRAGUT
Harbeck Collection

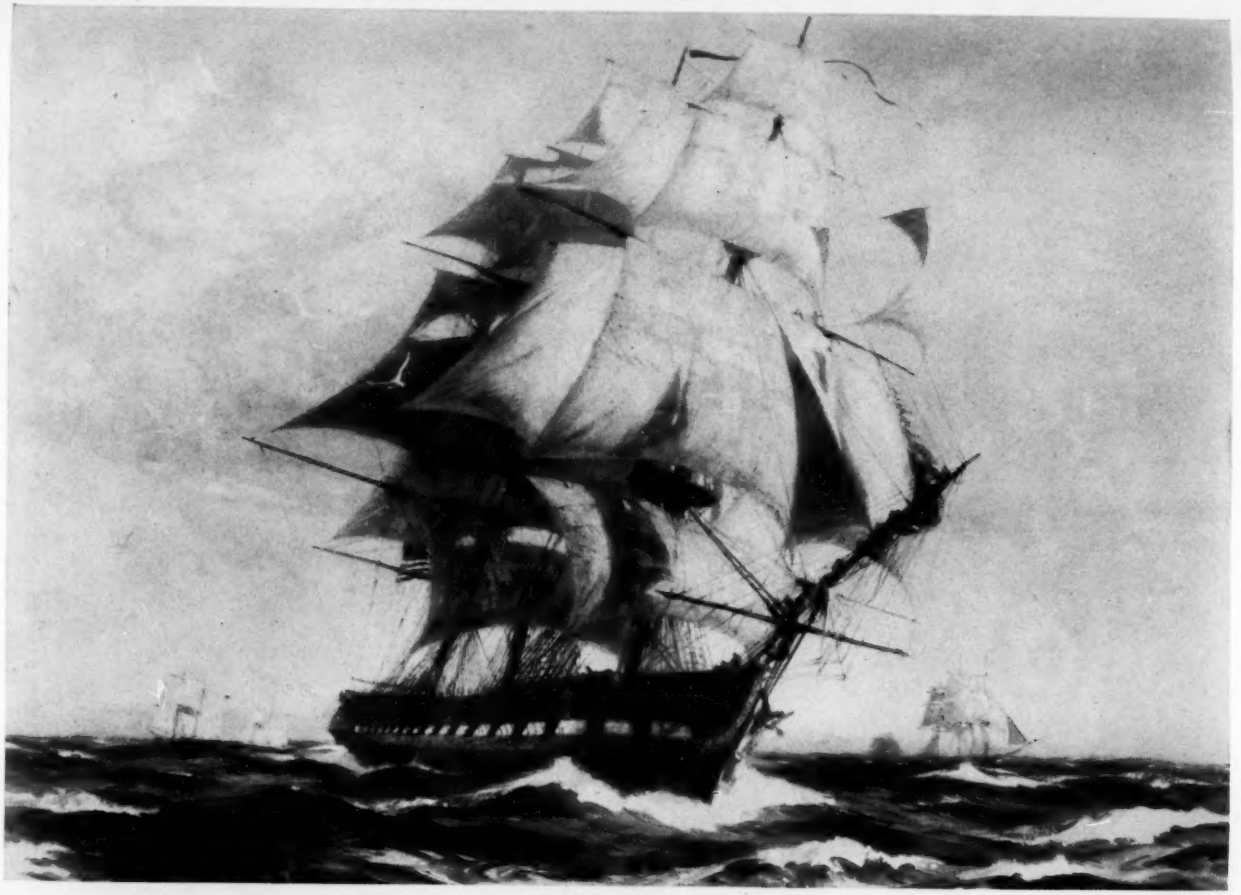


David Glasgow Farragut, 1864
In the uniform of a rear admiral, the first officer in the Navy to hold this rank. His rear admiral's pennant, also the first in the Navy, now hangs in the Naval Academy Museum. From the engraving by W. J. Jackman, Harbeck Collection.



FARRAGUT AND HIS AIDE, DRAYTON, ON BOARD U. S. S. "HARTFORD" SHORTLY BEFORE THE BATTLE OF MOBILE BAY, AUGUST 5, 1864. Left to right: Rear Admiral Farragut, his aide, Captain Percival Drayton, and Lieutenants H. B. Tyson and J. C. Watson.

"The Hartford"
Farragut's flagship in the battles of New Orleans (1862), Port Hudson (1863), and Mobile Bay (1864). In these three sharp actions the *Hartford* was hit 260 times.



COLORED LITHOGRAPHS OF THIS PAINTING OF THE "CONSTITUTION" BY GORDON GRANT ARE BEING SOLD BY THE COMMITTEE TO SAVE OLD IRONSIDES

Courtesy of Charles Grafly, the sculptor.

BUST OF FARRAGUT, TO BE UNVEILED MAY 5, 1927, IN THE HALL OF FAME, NEW YORK UNIVERSITY

UNITED STATES
NAVAL INSTITUTE
PROCEEDINGS

Vol. No. 53, No. 5 MAY, 1927 *Whole No. 291*

The Battle *of* Wanhsien

By LIEUTENANT COMMANDER GLENN F. HOWELL, *U. S. Navy*

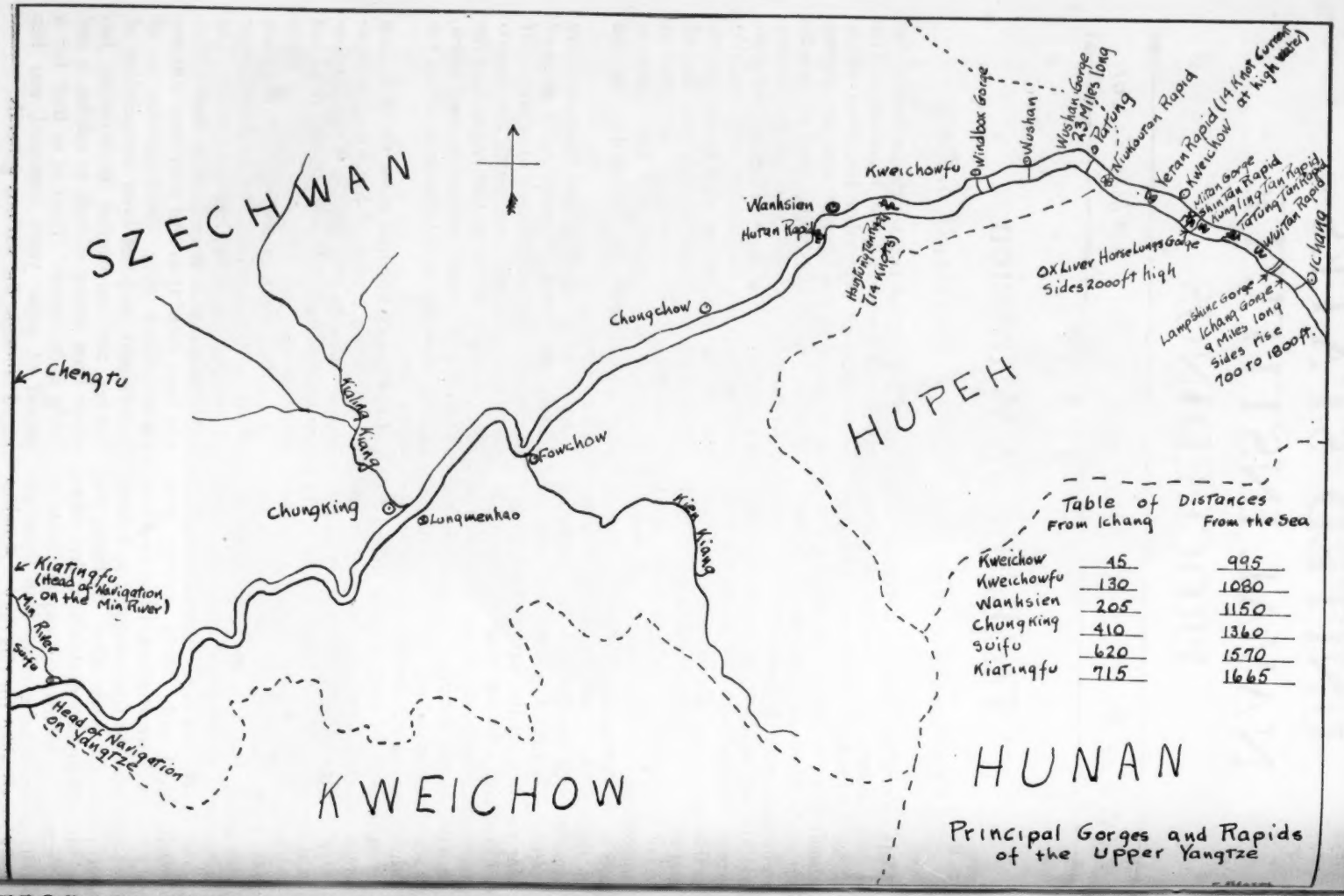
THE Yangtze River is navigable for steam vessels for a distance of sixteen hundred miles from the sea. Hankow, six hundred miles inland, can at all seasons of the year take ocean going vessels. Ichang, three hundred and fifty miles further inland, marks the upper limit of ordinary river steamers. Down from this point, the river runs through a vast alluvial plain, in places almost as fickle and capricious as to channel as is our Mississippi. (See map next page.)

Immediately above Ichang, however, ranges of high mountains begin and continue west through to Tibet. Through these ranges descends the Yangtze in a series of wonderfully beautiful gorges and awe inspiring rapids. At the top of these gorges lies Chungking, the commercial capital of the province Szechwan, three hundred and fifty miles above Ichang. Almost exactly half way between Ichang and Chungking is Wanhsien, an ancient, densely populated city built on the side of long, sloping hills a bit above a decided bend of the river. The usual anchorage for gunboats and merchantmen is along the shingle bank opposite the city. The Standard Oil installation is well below the place, and the few missionaries live outside the city and in the hills behind it.

The ascent of the rapids requires small, shallow draft, heavily powered steamers especially fitted with sturdy steering gear and three or four rudders. The result is that cargo must be trans-shipped at Ichang to and from the lower river steamers, for none of them could operate above that point. It is equally prohibitive for any gunboats to operate above Ichang other than those especially constructed for this duty. America has at present but two which can ascend the rapids, the *Palos* and the *Monocacy*. The British had in September but three which could perform this service with any degree of safety, the *Widgeon* and the *Teal,* practically sister ships of the *Palos* and the *Monocacy,* and the *Cockchafer,* a large river gunboat carrying one six-inch gun and available for service only during high water season. The French have three upriver gunboats of which one, the *Doudart de la Gree,* was at Wanhsien in September. The Japanese have several available for this duty and the Italians one.

About fifty merchantmen operate above Ichang, this number considerably reduced during the low water season in winter. Of these fifty steamers, one-fourth are American, one-third fly the British colors, and the remainder are under various flags—French, Italian, Swedish, and Chinese in about the order named.

Less than a hundred miles above Ichang is the eastern border of Szechwan, a province as large as the state of Texas, mountainous, with fertile valleys, a rich and populous state, a country in itself. Since the establishment of the Chinese Republic in 1911, this province has been the scene of one fruitless struggle after another. The military dominate it entirely and for a decade have ruled it to suit their own ruthless tastes. Since 1913, Szechwan has to all intents and purposes been independent of Peking, and the central government has never been strong enough to subdue it and bring it to terms. Thus it is that for a period of some years continual war has raged amongst the various generals.



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These Szechwan wars at times are almost amusing in that they frequently resemble nothing so much as chess games with the lesser generals and the various armies as pieces to be moved about at the will of the players. However, collisions are bound to result, a certain amount of actual fighting goes on, and an enormous expenditure of ammunition occurs. The money to support these operations, of course, comes from the civilian section of the populace, most of it from the merchants. There is no object to any of these wars other than the aggrandizement of the generals concerned. None of them stay in power longer than a few months. Not only in Szechwan but throughout China, whenever one general by dint of superior ability or strategy rises above the rest of his kind, all the others combine to produce his downfall, this regardless of whether or not they have been bitter enemies prior to this amalgamation.

Each general controls his own territory through military power alone. His object is solely to enrich himself, and he attains it by whatever means are at hand. He may or may not be allied with the general in control at Chengtu, the capital of the province. It apparently makes little difference. Suffice it to say that each general is a law unto himself and is responsible to no government. But one argument is ultimately convincing insofar as he is concerned. Negotiations are all right as far as they go; money talks very loudly; personalities count considerably; but force, actually or potentially at hand, forms the determining factor in many an argument. And as the turmoil in Szechwan increases year by year, force is rapidly becoming the deciding factor in clashes with these lawless generals.

And so, after this lengthy but necessary preamble, we come to Yang Sen.

Considerably better educated than the other Szechwanese generals, Yang Sen is a man ordinarily of outwardly pleasing personality, a gentleman with many wives and an overwhelming ego, an unreasonable individual all the more annoying because of the politely plausible nature of his arguments. More than a year ago other Szechwanese generals combined against Yang Sen and drove him out of the province. However, negotiations last spring permitted him to return up-river, and he established his headquarters in May at Wanhsien.

In general, foreigners hailed with relief the return of Yang Sen. It was felt that with his superior education and his contact with occidentals he would behave in a fair and impartial manner toward foreign shipping and that many of the existing troubles and annoyances would disappear with his advent upon the scene.

Quite the contrary took place. Of all the annoying, lawless, perverse generals who have ever been in power at Wanhsien, Yang Sen proved to be the worst of the lot—unreasonable, exasperating, and with an absolute disregard of treaty rights and the lives and properties of individuals.

Shipping difficulties at Wanhsien and along the river in that vicinity began coincident with Yang Sen's return to Szechwan. He asserted the right of search of foreign vessels, alleging that he feared that they were carrying arms, ammunition, and military personnel to his actual and potential enemies further up the Yangtze. American and British gunboats at Wanhsien properly refused this demand, for nothing of this character was being done nor had been attempted by the steamers of these countries.

He sent huge cargoes of opium down river in steamers flying the flags of China and some of the lesser European countries and as a result was in constant difficulties with the customs' authorities until they finally gave up in despair. He imposed illegal taxes and dues and required every vessel anchoring in the harbor of Wanhsien to pay him a direct bribe of three hundred Yuan dollars. He insisted that all shipping carry his soldiers up and down the river at his and their whims and was profoundly irritated at both Americans and British when the gunboats of these nations refused to permit this unlawful and unneutral practice. Clash after clash occurred between groups of his soldiers and the gunboats, for in many cases it was necessary for armed parties of American and British bluejackets to board merchantmen of their own nationalities and drive these Chinese soldiers off. This was usually done without actual recourse to arms.

In the beginning of June, H.M.S. *Cockchafer* took over the Wanhsien station and remained there throughout the summer. Constant trouble with Yang Sen occurred from the beginning of the *Cockchafer's* stay. Chinese armed troops were time after time

placed upon British ships, and the military insisted that they be carried from one place to another, with or without payment of passage. At the beginning, protests usually secured the removal of these troops, although delays of as much as three days frequently resulted to the merchantmen.

Early in August three British vessels, the *Wantung*, the *Wanhsien*, and the *Fushan* went down river from Chungking and on different dates were commandeered at Foochow, a port sixty miles above Wanhsien, by Yang Sen's soldiers, who forced them to carry hundreds of armed men.

On August 27, the steamer *Wanhsien* arrived at the port of that name upward bound to Chungking. During the night General Ju, one of Yang Sen's subordinates, boarded the ship with a hundred armed soldiers. The matter was reported to the *Cockchafer* at daylight the next morning. The ship was ordered to anchor close abreast the gunboat, and the general was informed that armed troops could not be allowed on British steamers as this was a complete breach of neutrality.

During that day, August 28, General Ju left the *Wanhsien*, but he gave his soldiers orders that they were on no account to leave the ship. He directed them to barricade themselves in the steel-enclosed afterhouse and to open fire to repel any attempt by the *Cockchafer* to send an armed guard to eject them. Snipers were posted with orders to fire on the *Cockchafer* should she attempt to move.

On the evening of the twenty-eighth the chief-of-staff of General Ju came on board the *Cockchafer*, and the whole matter was explained to him and the impossibility of British merchantmen violating neutrality by consenting to carry troops was stressed. To this the officer replied that three British steamers had during the month carried large numbers of troops from Foochow and that the present refusal to carry his general and bodyguard indicated rank favoritism and discrimination. It was patiently explained that these British ships had not willingly carried the troops but had been commandeered and forced to do the will of the military. The chief-of-staff then left the gunboat, stating that they would inform his general of the matter but would not promise to remove the troops.

On August 29, the *Wanliu* arrived at Wanhsien flying the signal: "Send an armed guard." The armed guard was sent, and the officer in charge of it received a disturbing report from the captain.

The ship, while discharging passengers at Yunyang, forty miles below Wanhsien and within Yang Sen's command, was boarded by sixteen armed troops. At the same time sampans containing armed soldiers approached the ship. The *Wanliu* proceeded at slow speed to avoid the sampans, but fire was opened from both banks. The troops on board rushed the bridge and the engine room but were driven back by the ship's officers.

Meanwhile a sampan containing eight soldiers in trying to come alongside fouled another, drifted astern in a sinking condition, and eventually sank. It is not believed that any occupants of this sampan were drowned, for it was closely surrounded by other sampans before it sank.

The *Wanliu* continued on her way. The sixteen soldiers on board seized and bound the compradore (head Chinese official of the ship). They threatened to kill him and also the captain. However, the British officers kept armed watch on the bridge, and the vessel safely arrived at Wanhsien.

These sixteen soldiers then endeavored to hold up the ship on the excuse that the soldiers in the swamped sampan had drowned and that compensation had to be paid for the loss of their lives. The signal to the *Cockchafer* was therefore sent. The armed guard from the gunboat promptly disarmed these soldiers and sent them ashore.

The *I'ling*, an American merchantman, had come into Yunyang on the heels of the *Wanliu*. She was boarded by the remainder of the troops who had attacked the *Wanliu*. She perforce carried them to Wanhsien and anchored there half an hour after the arrival of the *Wanliu*. The troops in the *I'ling* immediately landed and lined the bank abreast the *Wanliu*, threatening her with their rifles. Eventually by demonstration on the part of the armed guard the *Wanliu* was able to weigh anchor and proceed for Chungking.

Immediately before the *Wanliu* sailed upriver the original one hundred soldiers of General Ju, who had barricaded themselves in the *Wanhsien*, left the ship. Coincident with their departure four hundred armed soldiers belonging to Yang Sen boarded this vessel and took complete charge of her.

Yang Sen personally went on board with these soldiers and informed the captain that he intended arresting all British ships and holding them until full reparation had been made for the swamped sampan at Yunyang. His soldiers then barricaded themselves in the ship and posted snipers with rifles leveled at the *Cockchafer*. At the same time a large hostile demonstration was made against the gunboat by thousands of troops who lined both banks of the river.

That evening the British merchantman *Wantung* arrived in port from Chungking and was immediately boarded by three or four hundred armed troops who took complete charge of the ship and barricaded themselves in her.

On August 30, further hostile demonstrations were carried out against the *Cockchafer*. The three British officers in each captured merchant vessel were made prisoners in their quarters, and they were denied further communication with the gunboat.

On August 31, Yang Sen stopped all communication between the *Cockchafer* and the shore. Neither food nor fuel was allowed to be supplied. No sampans were permitted to visit the ship. The boatman of a sampan regularly employed by the gunboat, knowing nothing of this order, came alongside the ship early that morning. He was arrested by soldiers the moment he went ashore and was brutally butchered on the bank abreast the ship.

On September 1, an oil steamer arrived from Chungking with the British consul, who went on board the *Cockchafer*. The oil steamer returned to Chungking without interference as Yang Sen had been informed that she was bringing the consul to negotiate with him.

The consul landed to interview Yang Sen with a view to opening negotiations for the release of the British ships concerned. These negotiations utterly failed, for Yang Sen had now magnified the sinking by the *Wanliu* of one sampan containing eight soldiers into three junks containing sixty soldiers and eighty-five thousand silver dollars. He refused to listen to the question of removing the troops from the steamers until the matter had been settled. He also declined to agree to the removal of the foreign officers from the ships to the *Cockchafer*, regardless of the points that they were entirely innocent men and that he had not even made a charge against them. He still refused to release them even when a guarantee was offered that when these foreign officers were placed on board the gunboat the ships would remain at Wanhsien until the matter was settled.

On the morning of September 2, Yang Sen returned the call of the consul at the postmaster's house in the city. The consul again endeavored to open negotiations, but Yang Sen was defiant and decidedly truculent and refused to listen to any suggestions regarding the release of the ships. During this interview the general stated that he intended to hold the three officers in each ship as hostages to prevent force being used against him, and he threatened immediate execution of these six unfortunate men at the first hostile move of the British.

This hopeless state of affairs was reported to Rear Admiral Cameron, the Commander of the British Yangtze flotilla. He ordered the *Widgeon* to Wanhsien and promptly organized an expeditionary force from the war vessels in the lower river.

To form this expedition the British merchantman *Kiawo* was chartered by the government and placed in commission as a man-of-war. She was armed and manned by officers and men from the cruiser *Despatch* and the gunboats *Scarab* and *Mantis*. Commander Darley of the *Despatch* was placed in command of the entire operation. The objects of the expedition were to rescue the six captive merchant officers, to save if possible the Chinese crews of the two seized vessels, to disarm and to clear the troops from these ships, and to bring the vessels back to Ichang. Of necessity, in view of Yang Sen's threats, the attack had to be in the nature of a surprise lest the six officers be killed before they could be rescued. The expedition proceeded up-river with secrecy. The *Kiawo* left Ichang looking as usual except for the white ensign. En route to Wanhsien she was repainted a curious camouflage of red, gray, and black.

It has been surmised that a surprise would be possible and that when the *Kiawo* drew alongside the ships the troops on board would surrender and clear off. However, events developed that Yang Sen knew all about the expedition and laid his plans accordingly.

On the afternoon of September 5, the troops, both on the banks and in the cap-

tured ships, became very threatening. The *Wanhsien* officers had before this barricaded themselves within their armored bridge. They had plenty of food and obtained water by lowering buckets over the side at night. The *Wantung* officers were not so fortunate, for they were prisoners amidships in their dining saloon. During this afternoon the *Widgeon* took a position on the port beam of the *Wantung,* and the *Cockchafer* took station on the port quarter of the *Wanhsien.* Great anxiety was felt in the gunboats as to the fate of the six merchant officers, for it was feared that they might be dragged out and executed at any moment.

Late in the afternoon the *Kiawo* was sighted standing up the river. With her naval personnel under cover, she proceeded straight to the *Wanhsien.* On board both captured ships no stir of excitement appeared. The soldiers were lolling about the decks, and some were even calmly eating their evening meal. As the *Kiawo* went alongside the *Wanhsien* a soldier took a line from the man-of-war and secured it.

Then an inferno exploded.

As the British sailors rushed out on deck to attack and board the enemy, scores of Chinese soldiers ran out from behind concealed positions and opened a withering fire upon the British with rifles and machine guns.

The tars responded valiantly and attempted to board in the face of a terrific fire.

Commander Darley, who was on the bridge with Captain Williamson, the master of the vessel, cried out: "Look after the ship, Captain! We are in for it! My place is with my men."

He snatched up two revolvers and rushed into the fray.

Followed by his devoted bluejackets he boarded the *Wanhsien,* but he was bayonetted almost immediately, and the boarding party was driven back. Two men volunteered to get his body, which was lying in plain view, but these brave fellows were shot down and the body was not recovered.

Had the people in the *Kiawo* known that the officers were barricaded in the bridge the operation would have been much simplified, but for some time it was believed that they were held prisoners in the staterooms. The attack was accordingly directed amidships. Furious fighting continued, and repeated attempts were made to board the *Wanhsien.*

Eventually the naval party found out where the merchant officers were, and they pulled them one by one from the wing shutter of the bridge. The three officers safely rescued, the *Kiawo* hauled off and poured a hail of bullets into the *Wanhsien,* raking her fore and aft and killing the soldiers by the scores.

The *Kiawo* then went for the *Wantung,* putting her bow alongside the stern of the captured vessel. Here again the fighting was intense. The officers were actually imprisoned amidships expecting death at any moment. Boarding was repeatedly attempted, but it speedily became apparent that it could not be accomplished in the face of the galling fire.

In desperation the captain broke loose from the soldiers, ran over the upper deck of the *Wantung,* and leaped across to the *Kiawo.* He was shot in the neck while jumping, fortunately not a severe wound. The two other officers threw off their captors, rushed to the side, and jumped overboard. The chief officer saved himself by swimming to the *Doudart de la Gree.* The unfortunate chief engineer was shot while struggling in the current and was drowned.

The *Kiawo* then shoved clear of the *Wantung.* In the meanwhile a general engagement was going on.

No sooner did the fight between the *Kiawo* and the *Wanhsien* begin than the troops on both banks of the river opened up on the *Cockchafer* with a very heavy rifle and machine gun fire. Captain Acheson of the *Cockchafer* gave the order to commence action, mounted the ladder leading to the bridge, and fell helpless to the deck, shot in the back by a sniper on the bank. The bullet fortunately was deflected by the heavy belt he wore and so missed a vital part. For two hours this gallant officer lay on his back, powerless to move his body but directing the fire and ordering the details of the battle. His executive, the only other officer attached to the ship, was killed early in the engagement.

Field pieces opened up upon the *Cockchafer* from the city and from four separated points about the harbor. The *Cockchafer* first tried to silence these guns with her lighter battery but was unable to do so. She then opened up with her six-inch gun and managed to do some heavy damage. She was being fired upon from all sides—the

city, both banks, the *Wanhsien*, and the *Wantung*.

In the meantime the *Widgeon* was by no means idle. Coming under a heavy fire herself, though the Chinese concentrated on the *Cockchafer*, the *Widgeon* endeavored to silence the batteries, both in the city and around the harbor. After the *Kiawo* was clear of the *Wantung*, the *Widgeon* bombarded that vessel, killing many soldiers who were barricaded behind the armor on the bridge.

In silencing the batteries mounted within the city considerable damage was necessarily done, fires springing up here and there. One six-inch shell passed along a narrow street, not hitting anything and the flimsy walls of the houses on both sides collapsed like paper from the terrific suction.

By the time the *Kiawo* had hauled off from the *Wantung*, the officers in her were either killed or wounded. So the master of the ship took her down-river and anchored for the night five miles below the city.

The *Cockchafer* and the *Widgeon* continued the battle until dusk and then got underway and proceeded down-river, leaving the *Wanhsien* and the *Wantung* floating shambles and the city ablaze in four points.

The two gunboats anchored near the *Kiawo*, and the expedition drew breath and took account of the casualties. Of the seven officers who participated in the engagement, three were killed and two wounded. Four bluejackets were killed and thirteen wounded. Out of the one hundred and ten naval officers and men engaged in the battle twenty per cent were casualties.

As to the Chinese losses, it will never be known how many were killed and wounded. A conservative estimate would put the number of their casualties as 500, mostly soldiers. It is surprising that this number was not greater.

The captain and the executive officer of the *Widgeon* were the only remaining officers available for duty. Both the *Widgeon* and the *Cockchafer* were almost out of fuel. It was therefore decided to proceed to Ichang.

The executive officer of the *Widgeon* took command of the *Cockchafer*, and at daybreak the gunboats and the *Kiawo* proceeded down-river to Ichang.

Negotiations ultimately came about, and Yang Sen after some delay released the *Wanhsien* and the *Wantung*. New crews were sent up, and the ships finally arrived at Ichang.

The tribulations of the British naval wounded were not yet over. There were insufficient hospital facilities available for them at Ichang, and they were therefore placed on board the British merchant steamer *Kiangwo* to be sent in her to Hankow. The ship arrived at a point five miles above the destination only to receive a terrific fire from Cantonese soldiers on both sides of the river. Thrice within two days the *Kiangwo* attempted to run the gauntlet but each time was forced to turn back by heavy rifle and machine gun fire.

Then on the morning of the third day along came a convoy consisting of two merchantmen, two American gunboats, and the American destroyer *Stewart*. This convoy had just been subjected to heavy fire by the Cantonese, a brisk little engagement which terminated abruptly when the *Stewart* planted a four-inch shell in the midst of these bolshevistic disturbers from the South.

The convoy stopped long enough for one of the gunboat doctors to take over to the *Kiangwo* fresh dressings and medical supplies, then proceeded on their way up-river.

The *Stewart* took the wounded on board and put them below the waterline and behind armor. The destroyer then brought her helpless passengers to Hankow, passing through the lines without a shot being fired. The *Kiangwo* won through that afternoon in a severe machine gun fire.

The reactions to this Wanhsien affair were many and serious.

Outside of Szechwan the Chinese people in general displayed little interest, although the Cantonese (Red) element promptly seized upon it and played it up as another illustration of "imperialistic policy."

Anti-British propaganda arose all over Szechwan, and especially at Chengtu and Chungking. Most of the foreign women and children at Chengtu had evacuated. At Chungking foreign bungalows outside the city were wrecked and looted, and anti-foreign demonstrations occurred. An anti-British boycott resulted. All of the women and children evacuated down-river.

Peking made feeble noises indicating displeasure at the affair. However, Szechwan and Peking ordinarily mean about as much to each other as do Alaska and Mexico.

The Defense Against Propaganda

By K. L. Buell

THERE is no subject, with the possible exception of war and military affairs, about which the average man knows so little, yet thinks that he knows so much, about which there is so much muddled thinking and so many false ideas, as that of propaganda. Propaganda is an art that has reached a high degree of perfection in Europe, that requires highly specialized skill and that is extremely dangerous in unskilled hands. It is an art that can get results, far reaching, important results, with surprising accuracy and speed. Yet it is a subject about which there seems to hang an air of mystery and suspicion.

Everyone, of course, uses propaganda in some form, whether it is in the form of paid advertising for his business, or in the form of dress and ceremonial manner designed to attract attention to his profession, or merely the attempt to live and behave in such a way as to create a favorable impression upon his neighbors. Many persons of wealth and position go much further and engage in activites that frankly use propaganda, or publicity as it is usually called, to attract attention to a cause. It is publicity when you use it yourself and propaganda when the other man uses it.

In the early days of the republic, when the stability of the nation was uncertain and we were in constant danger of being swallowed up by the great military powers of Europe, there was a great deal of nationalistic, patriotic propaganda, so much, indeed, that we gained a reputation abroad for being unduly boastful and for waving the flag in season and out. But as time has elapsed we have grown in strength. This excessive national enthusiasm has grown distasteful. Those of us who still believe that this country is the finest in the world, that it has a unique mission to perform in the development of mankind, are not so diligent in keeping that idea before the people as a whole. We are inclined to rest on our laurels. But in the meantime communications have vastly improved, facilities for the dissemination of ideas have multiplied enormously and we have become necessary to the plans of other powers.

These other powers have kept up-to-date in their use of propaganda. They have skilled men constantly working at that one problem. They use every means for the dissemination of thought—the press, the theater, the moving picture, the radio and the lecture platform—and they employ every bit of the knowledge that the newer psychology has produced, together with the skill gained in centuries of intrigue, to inculcate their own ideas in the mind of the American public. Meanwhile, we continue to use the firecrackers (considerably censored for the safety of immigrant children) and the stereotyped patriotic speech of Revolutionary days to keep the American ideal before our people. And, of course, we are losing ground. Foreign ideas, subversive ideas, un-American ideas are slowly but surely permeating the body politic. If we are to combat this highly skilled, very modern foreign propaganda, we must do more than regret the situation.

Glimmerings of this idea, as applied to national affairs, have occurred from time to time to persons connected with the government. During the war we had a great machine for the dissemination of propaganda. In spite of the fact that it was overdone in some respects, and clumsily done in others, it was exceedingly effective. But the lessons learned at that time have not been applied to keeping up the national defense in peace time, though they have been absorbed and are now being used by our potential enemies. Occasionally and sporadically there is a feeble attempt on the part of the government to do something about it. Bolshevik propaganda of the violent type is suppressed. Statements are issued from time to time, of course, and mysterious "spokesmen" make comments. But when it comes to anything more subtle, our govern-

ment agencies, in contrast to those of Europe, are surprisingly inept.

The greatest difficulty in the way of a constructive program for an adequate attack upon foreign propaganda, and an adequate defense of our own ideals, is the attitude of the most respectable and patriotic section of our best people toward the use of propaganda. In spite of the fact that this weapon is being used against us, there is a strong aversion to adopting it for our own use. The idea seems to be that, while our enemies may be wicked, may stoop to the use of these modern and unusual weapons, we must remain pure, dignified and sportsmanlike and continue to fight in the time honored manner. Our attitude towards propaganda is much like that of the knights in armor against a certain invention that put them *hors de combat* before they had had a chance to fight. And this is in spite of the fact that we have before us a horrible example of this particular fallacy in the pacifist propaganda itself.

The truth of the matter is that those who, through accident or choice, have had occasion to use propaganda for one or another purpose, and who have thus become skilled in its use, see a very clear menace to the safety of our country and its institutions through our lack of defense on matters of opinion. When the government does speak it has, of recent years at least, spoken to good effect. But there is a great mass of propaganda being spread throughout the country by private, or supposedly private, agencies against which we have prepared no defense whatever, leaving it to private interests to supply the remedy. Mr. Garet Garrett in a recent article in the *Saturday Evening Post,* quoted at some length in the PROCEEDINGS for February, brings out this point admirably and lists numerous agencies of the sort described. If space had permitted, he could, no doubt, have listed a great many more. But neither he, nor the *Post* in its editorial, nor any substantial conservative group of which the writer is aware, suggests any adequate method by which this propaganda may be combatted. The idea seems to be that if we will all be calm and use reason and withhold judgment until we have heard all the facts, assuming we can get all the facts, we shall not be susceptible to propaganda. Quite so. And it is also true that if all men were kind, generous, intelligent and calm we should have no war. The two positions are analogous.

The pacifists have a poster which, from time to time, breaks out like a rash in various communities. It reads "Law not War." This particular bit of exasperating propaganda has, of course, a superficial plausibility. If all the nations of the world could agree upon a code of laws and would live up to them, war might no longer be necessary. But the effect that the poster is intended to convey, and does convey to many minds, is that the United States of America should set an example of peaceful intent by refusing to arm for defense. And the immediate effect upon the individual voter is to induce him to bring pressure to bear against adequate appropriations for the Army and the Navy.

The argument presented by many well meaning persons against the use of propaganda is, in essence, exactly the same as the "Law not War" slogan. In the editorial from the *Saturday Evening Post* previously referred to, under the caption "Propaganda and the Antidote" occurs this statement, "The most important lesson that Americans can learn today is to recognize propaganda for just what it is whenever they hear it or wherever they read it, and then to get the other facts; to decide important questions that affect the welfare of the nation with their minds and not with their emotions. It is not enough to feel deeply; one must think deeply." This sentiment, reduced to a slogan, reads "Reason not Propaganda." And this attitude of the *Post* is by no means unique. It is shared by a large portion of the most responsible men of the nation, backed up by almost the entire press. The people who are most scornful of those simple souls who are misled by the "Law not War" slogan are the very ones who cherish most carefully the "Reason not Propaganda" slogan.

It is impossible, in the brief space allotted, to give the practical steps required for an adequate defense of this country against foreign propaganda, just as it would be impossible to give, in the same space, the practical steps necessary for the country's physical defense. This knowledge exists but our best minds are at present too proud to use it. Of course, it would be possible to suggest an outline for the solving of this problem but before any practical steps can be

taken it will be necessary to revise the attitude of our best opinion towards the whole matter of propaganda defense.

It is useless to meet heavy artillery with pop guns. It is equally useless to try to meet skilful, highly emotionalized propaganda with an appeal to reason. It simply can't be done. We can't give all the people all the facts. Moreover, while we are probably, as a people, the most highly educated and the most reasonable in the world, to educate every man, woman and child to the point where he will think deeply, make an honest search for the facts and decide upon the basis of pure reason the numerous questions that come before him for judgment is a gigantic task that will take years, perhaps centuries, to accomplish. We should certainly work toward that millenium. But in the meantime we must take the human mind as it is. We must use skill to fight skill, and emotionalism to fight emotionalism. Any other course is as foolish as to scrap our national military defenses and to wait helplessly for the day when all men will be brothers.

The best defense is a vigorous offense. If it is true, and there is adequate evidence to support the belief, that there is a highly skilled foreign propaganda at work in this country, the only possible defense is to meet it, either here or abroad, or both, with a propaganda equally skilled. If it is true, as Mr. Garrett states, that, "We have in this country, for example, a British point of view and a French point of view on the war debts; in neither England nor France is there an American point of view on the war debts," then something should be done about it. If our point of view is not represented abroad, the propagandist arises to inquire "Why isn't it?" If the good will of the world is of value to the United States it would seem nothing short of folly to permit the other governments of the world to work their people into a frenzy of hate without taking measures to combat this government propaganda in the countries of its origin. If English and French propagandists, for instance, are so successful in influencing public opinion in this country, why have we no adequate staff of propagandists playing the same game abroad? It may be that diplomacy is supposed to handle this problem. But the wholly adequate answer is that diplomacy has not done so, if Mr. Garrett's observations are correct. It may be difficult to persuade the average voter that he should be taxed to maintain speakers and writers abroad, but the fact remains, as pointed out by Mr. Garrett, that he is now paying for foreign propaganda in this country. It is exactly as though the public preferred to support an invading army rather than to oppose it. It is a case of millions for tribute, but not one cent for defense.

Moreover, it is only common sense, reasonable caution, and enlightened self interest, to meet the invasion of foreign opinion in this country in a manner that will assure success, to so place the American point of view before the people that they will not be susceptible to the other side. It is a battle that should be fought to win. All the weight of inertia is already on the side of patriotism —conservatism, a sturdy native shrewdness. If the emotionalized foreign point of view is gaining headway against this inertia there is something wrong with the methods of those who are charged, or have charged themselves, with the defense of American institutions.

There is no question, for instance, but that the needs of the Army and the Navy are inadequately understood by the mass of the people. It is not safe to assume that the public understands anything. There are many voters, especially among the new women voters who do not know enough about history, and about foreign affairs, to know that we need a national defense. They have no really clear idea as to why it is necessary to back up our moral influence with force. This is not due to stupidity or perversity but to the fact that pacifists, internationalists, socialists, and foreign powers working through these groups, are using every possible weapon of propaganda, including the appeal to emotionalism, while the needs of the military establishment and even the purpose of the military establishment are assumed to be understood. Without clear knowledge of the facts these new voters are susceptible to emotional appeal. When told that a big navy will frighten poor, dear, Europeans, they are inclined to believe it. But if the facts are presented to them in language that can be understood and in a form that is palatable they will be as inclined to support the national defense as they are now inclined to vote against it. But it must be skilfully done. It must be done

in such a way as to reach the people who most need to be reached and it must be done with emotionalism. The answer, for instance, to the appeal for the brotherhood of man—a deeply emotional ideal fostered through centuries by the Christian church—may be an argument on the psychology of the Orient or may be the sight of the Stars and Stripes waving in the breeze and the singing of *Home, Sweet Home.*

It is supposed to be unethical or improper to appeal to the emotions of mankind rather than to reason; to select facts and arguments skilfully rather than to throw out a chaotic hodge podge from which the average citizen is supposed to select the truth, on the theory, apparently, that the truth will prevail. The worst thing that can be said of an opponent is that he uses propaganda. This is the official respectable point of view. Yet no such procedure is actually put into practice by the individual, or the organization, or the paper, who has a cause or an end in view. Each man presents to the public his own private cause and his own personal aspirations in the most favorable light, as a matter of course.

This procedure has been honored through the centuries in the law courts where each side presents its case as favorably as possible in order that the jury, having heard both sides presented with bias, may weigh the two points of view and come to a just decision. If one side is adequately presented and the other side very badly presented it will be difficult to reach a just decision. To make sure that a man who may be slow witted or inarticulate has a chance to present his case properly specialists represent him and speak for him. But when it comes to large questions of national importance that must be decided by the whole people it is considered enough that someone to whom propaganda is only a side issue shall take care of the subject in his off moments.

There was an attempt, for instance, made by Congress not long ago to get at the bottom of prohibition propaganda, for and against. Congress appointed an investigating committee and witnesses were called from all over the country. It was a golden opportunity to reveal the workings of non-governmental propaganda on a large scale. But the lawyers, no doubt extremely able in their own field, were so unfamiliar with the subject of propaganda that they did not ask the questions that would have brought out the facts. Again and again they led the witness up to a point where another question or two would have brought out a startling revelation and then failed to ask the question. This, however, was a failure in technique rather than a failure of the idea. It would aid greatly in the suppression of false foreign propaganda if there were a permanent congressional committee charged with the investigation of this subject with power to subpœna witnesses and with permission to hold public hearings on a variety of controversial subjects. The source of much foreign propaganda, its personnel and its financial backing, would thus be revealed. The records over a period of years would show some surprising correlations. Some such plan as this would help the public to arrive at the facts.

But even those thinkers who agree that the public needs some help in the discovery and selection of the facts balk at the emotional appeal. There seems to be a feeling that it is undignified to hold an opinion with enthusiasm. There is a prejudice against arousing any public emotion, even that of patriotism and national pride. Things have reached a point where it is possible for veterans to be scoffed at in the public streets without causing a violent reaction on the part of good citizens. The most patriotic of our newspapers and the most loyal of our patriotic societies are so afraid of hurting the feelings of some immigrant group that they will not defend American institutions with fire and enthusiasm. And the idea that public emotions may be aroused deliberately, in a good cause, is everywhere decried. Yet it is a commonplace of psychology that an intellectual opinion must have emotional force behind it, if it is to be stable and lead to action. Or, in other language, a man convinced against his will is of the same opinion still. It is therefore obvious that any proposition, no matter how sound, any sentiment, no matter how noble, must make an appeal to the emotions, as well as to the reason, or it will fail in its effect. Not even national safety is an exception to this rule.

The only possible alternative is a complete bureaucratic control of all speech. It is simply impossible to prevent the spread of propaganda in any other way. If a paper refuses to print an article by a man with a cause he will hire a hall, make a

speech and have it printed as news. Failing that, he may get it into the movies, or convert some editor to his point of view. And, of course, a complete abrogation of our rights of free speech would be so drastic a measure that the cure would be worse than the disease. Such a step would be a help in national defense, unquestionably, but the country would no longer be worth defending. To take such a course would be to surrender to superior foreign strategy without the firing of a single shot.

If, then, we are to meet the invasion of foreign propaganda effectually, if we are to preserve characteristic American ideals against the onslaught of foreign opinion, much of it false opinion manufactured for our injury, we must take action that will have some hope of success. We must disabuse our minds of the prejudice against propaganda as such and make ready to use that weapon ourselves. By all means let us set up foreign ideas as something to hate, whenever they can be shown to be disingenuous ideas spread for unfriendly purpose. But let us make the fight against the ideas themselves and not against the methods used in their dissemination.

The remedy for foreign propaganda, therefore, is to fight fire with fire, to use airplanes against airplanes, to match poison gas with stronger poison gas. To do anything else is to class ourselves with the pacifists and all those other dainty souls who are too proud to fight. To refuse to use our most effective weapons because we are told by our potential enemies that they will not look upon this course with approval is to do exactly what those potential enemies wish us to do. If, as we are told by foreign propagandists, pacifists and others, such a course will annoy our enemies, it is simply too bad. They can very quickly and easily solve the difficulty by ceasing to annoy us.

Guns Allowed Aircraft Carriers—*A* Paradox

By CAPTAIN WALTER S. ANDERSON, *U. S. Navy*

THE preliminary disarmament discussions at Geneva in 1926 occasionally produced something extra good. "I see by the papers," as Mr. Dooley says, that one of the best contributions to those discussions was made by Rear Admiral Hilary Jones, senior representative of the United States Navy.

It will be remembered that considerable of the discussion was along a highly theoretical and abstract line. So much of it was of this nature, promising but small practical results, as unfortunately to seem a poor recommendation for such preliminary discussions. There seemed to be a suggestion of futility of discussion unless backed by authority to take definite action. The American delegation, had, however, offered a definite and practical plan for discussion, which plan was concurred in by the British, Japanese, and some other delegations. The feelings of these delegations may be imagined as the abstruse and unpromising discussions developed.

Finally, one of the distinguished naval officers from a certain continental European country, in offering difficulties to the proposition of limiting tonnage of naval vessels by classes, said it would be difficult to classify vessels. For example, he said, "What would you call a battleship that was armed only with three-inch guns?"

To this Admiral Jones replied that he would call it a joke.

It would be difficult to sustain the thesis, as a sensible proposition, that the bigger a ship is, the smaller its guns should be, or the fewer its guns should be. If the reader concurs that such a proposition is absurd, it may be interesting to consider in that connection one or two of the articles of the Washington Treaty for the Limitation of Naval Armament.

A certain clever married woman, in advising a younger married friend, said: "My dear, don't go poking among your husband's private letters and papers. It can only bring you sorrow." Perhaps there is something of futility, and certainly, from the American viewpoint, considerable that is sorrowful, in studying closely the Washington Treaty.

That the end sought by many who contributed to that treaty was wholly desirable is not denied. Certainly the voices of American naval officers have not been raised against the application of the principle of voluntary limitation of naval armament by the various powers, provided that limitation were upon an equitable basis. The treaty as completed contained certain ratios of warship tonnage of certain kinds allowed the respective signatory powers. Not only was comparison implied, but it was necessarily written into the treaty in the most specific terms. Yet there are those who maintain that too close discursive comparisons should not now be made, as they might compromise friendly international feelings.

The fact that the ratios have been largely vitiated in the Pacific in a manner principally adverse to the United States by Article XIX is a considerable story by itself. It is one that will not be retold here, but one worthy of American consideration.

No criticism of any country or any person is intended by these remarks, except as the facts themselves constitute an indictment. The facts seem to indicate that the United States did not come out of the Washington Conference in as good a position as other countries as respects limitation of naval armament. But this constitutes no criticism, direct or implied, of any other country or its representatives. If the United States lost at the Washington Conference table Americans need not look abroad for those to blame.

Therefore these observations are not directed at our friends across the sea. We respect their diplomacy. These words are written in the hope of contributing a mite toward the avoidance in the future of mistakes similar to those in the Washington Treaty. Another disarmament conference

impends. Inequities in the Washington Treaty should be recognized for what they are. Unfair provisions in such a treaty lead neither to security nor peace, which are the objects sought by such treaties.

A good many of the inequities of the Washington Treaty, including Article XIX, have received considerable belated publicity. There seems to have been comparatively little even belated comment about certain features of Articles IX and X. They merit examination.

Articles IX and X of the Washington Treaty Limiting Naval Armament are here quoted:

ARTICLE IX

No aircraft carrier exceeding 27,000 tons (27,432 metric tons) standard displacement shall be acquired by, or constructed by, for or within the jurisdiction of any of the Contracting Powers.

However, any of the Contracting Powers may, provided that its total tonnage allowance of aircraft carriers is not thereby exceeded, build not more than two aircraft carriers, each of a tonnage of not more than 33,000 tons (33,528 metric tons) standard displacement, and in order to effect economy any of the Contracting Powers may use for this purpose any two of their ships, whether constructed or in course of construction, which would otherwise be scrapped under the provisions of Article II. The armament of any aircraft carriers exceeding 27,000 tons (27,432 metric tons) standard displacement shall be in accordance with the requirements of Article X, except that the total number of guns to be carried in case any of such guns be of a calibre exceeding six inches (152 millimetres), except anti-aircraft guns and guns not exceeding five inches (127 millimetres), shall not exceed eight.

ARTICLE X

No aircraft carrier of any of the Contracting Powers shall carry a gun with a calibre in excess of eight inches (203 millimetres). Without prejudice to the provisions of Article IX, if the armament carried includes guns exceeding six inches (152 millimetres) in calibre the total number of guns carried, except anti-aircraft guns and guns not exceeding five inches (127 millimetres), shall not exceed ten. If alternatively the armament contains no guns exceeding six inches (152 millimetres) in calibre, the number of guns is not limited. In either case the number of anti-aircraft guns and of guns not exceeding five inches (127 millimetres) is not limited.

From reading those two articles some things are plain, and some things are not so plain to the casual reader. Briefly, the following is provided:

(a) The tonnage limit of an aircraft carrier is 27,000.

(b) There is one exception, as follows: Any power may make over into carriers not exceeding 33,000 tons each, two ships that otherwise would have had to be scrapped.

(c) No carrier may carry a gun greater than eight inches in caliber.

(d) The main armament of a carrier is unlimited as to number of guns if none of them exceed six inches in caliber.

(e) A carrier is unlimited in the number of its anti-aircraft guns and guns not exceeding five inches in caliber.

(f) The main armament of a carrier *not over 27,000* tons may not exceed *ten* guns if any of them exceed six inches in caliber.

(g) The main armament of a carrier *over 27,000* tons may not exceed *eight* guns if any of them exceed six inches in caliber.

These points may be summed up as follows:

(1) An aircraft carrier may carry an unlimited number of anti-aircraft guns, or guns not exceeding five inches in caliber.

(2) An aircraft carrier may carry an unlimited number of guns if none of them exceed six inches in caliber.

(3) As many as ten guns larger than six inches but not exceeding eight inches in caliber may be carried by an aircraft carrier not over 27,000 tons, but not more than eight such guns may be carried by an aircraft carrier of greater tonnage. That is, one aircraft carrier may carry ten eight-inch guns, but a larger carrier by the limitation of these articles may carry but eight eight-inch guns.

The limit, arbitrarily fixed by Article IX, is 27,000 tons. It will be interesting to see just where this limit strikes the aircraft carriers of the nations signatory to the Washington Treaty. But four of these nations have aircraft carriers, built and building. For convenience, the significant data are shown in the accompanying table.

AIRCRAFT CARRIER DATA

NAME	DATE	DISPLACEMENT IN TONS (NORMAL)	GUNS	SPEED IN KNOTS	REMARKS
		British (b)			
Hermes	Sept. 11, 1919	10,950	6–5.5 inch (50 cal.) 3–4 inch A. A. 4–3 pdr. A. A.	25	
Eagle	June 8, 1918	22,790 (Deep load 26,200)	9–6 inch (50 cal.) 5–4 inch A. A. 4–3 pdr. A. A.	24	Late battleship
Argus	Dec. 2, 1917	14,450	2–4 inch (50 cal.) 4–4 inch A. A. 4–3 pdr.	20.75	Late liner
Furious	Aug. 15, 1916	About 19,100 (Full load about 22,900)	10–5.5 in.(50 cal.) 6–4 inch A. A. 4–3 pdr.	31 Good for 32–33	Late crui er
Courageous (Building)	Feb. 5, 1916	About 18,600 (Full load about 22,700)	Probably same as *Furious*	31	Late cruiser
Glorious (Building)	April 20, 1916	Same as *Courageous*	Same as *Courageous*	31	Late cruiser
		Japanese			
Akagi (Building)	April 22, 1925	26,900	10–8 inch 4–4.7 12–4.7 inch A. A.	28.5	Originally laid down as battle cruiser of 42,000 tons
Kaga (Building)	Nov. 17, 1921	About 27,000		23 ? (original design)	Originally laid down as battleship of 39,900 tons
Hosho	Nov. 14, 1921	9,458	4–4.7 inch 2–3 inch A. A.	25	
		United States			
Lexington (Building)	Oct. 5, 1925	33,000	8–8 inch (55 cal.) 12–5 inch A. A. (25 cal.) 4–6 pdr. (4–21 inch torpedo tubes)	34.5	Originally authorized as battle cruiser
Saratoga (Building)	April 6, 1925	33,000	Same as *Lexington*	34.5	Same as *Lexington*
Langley	Launched Aug. 24, 1912 converted 1920–21	12,700	4–5 inch (51 cal.)	14.99	Ex-collier *Jupiter*
		French			
Bearn (Building)	Launched 1920	21,450	8–6.1 inch 6–14 pdr. A. A. 8–3 pdr. A. A. (4–21.7 inch torpe do tubes)	21.5	Laid down 1914 as battleship

NOTES TO TABLE OF AIRCRAFT CARRIER DATA

(a) Data from *Jane's Fighting Ships, 1926*, and from U. S. Office of Naval Intelligence as of October 1, 1926.
(b) There is also one seaplane carrier building in Australia.
(c) By Article VIII of the Washington Treaty "all aircraft carrier tonnage in existence or building on November 12, 1921, shall be considered experimental, and may be replaced, within the total tonnage limit prescribed in Article VII without regard to age." Of all the carriers now built, only the *Furious* is not "experimental." That ship underwent refit and complete alteration of appearance in 1921-25.

Of the six carriers of Great Britain, built and building (or being converted to use as a carrier), not one exceeds 27,000 tons. The *Eagle,* at deep load, displaces 26,200 tons, which is sufficiently near the limit to suggest that it may have inspired the limit.

If it be correct that the British carriers *Courageous* and *Glorious* will have the same heavy battery as the *Furious,* then no British carrier will have guns exceeding six inches in caliber. In other words, their number of guns will be unlimited, and future increases in number may be made at will, subject only to structural limitations. However, if the British so elect, the *Courageous* and *Glorious,* both considerably smaller than the *Saratoga* type of the United States, may each carry two more eight-inch guns than the largest American carrier.

Japan, in converting to carriers her two partly built heavy ships, is faced with the proposition of having radically to cut down the displacement they were designed for, or of having carriers above the limit. Japan has elected the former alternative. The *Akagi,* originally expected as a battle cruiser to displace 42,000 tons, converted to an aircraft carrier will displace 26,900 tons. Similarly, the *Kaga,* intended as a battleship to displace 39,900 tons, as a carrier will displace 27,000 tons. And the *Akagi* will carry ten eight-inch guns. Presumably the *Kaga* will carry the same.

The two big carriers of the United States, the *Lexington* and the *Saratoga,* now being converted from the partly built battle cruisers of the same name, will displace 33,000 tons. By Article IX they are limited to eight eight-inch guns, and that will be their main battery.

The smaller Japanese aircraft carriers will out gun the larger American carriers.

It may be contended that on the smaller displacement there cannot be carried the engineering plant required to equal the speed that a larger carrier could make, and that therefore, to give equality, the smaller carrier should be permitted to have the greater battery. However, speed is in any ship a vulnerable possession, easily lost. Carriers cannot be so heavily armored as battleships, and still have greater speed, which they must have, as they are more lightly armed. And even battleships are liable to considerable diminution in speed under comparatively light punishment.

The new American carriers are immense ships. Big ships afford big targets for guns, torpedoes, mines and bombs. Why should they not be allowed commensurate batteries?

Article IX puts a big premium upon keeping the displacement of an aircraft carrier within the 27,000 ton limit. And there are other considerations in favor of the smaller aircraft carriers, as stated by *The Engineer* of August 6, 1926, after giving some characteristics of the American and Japanese carriers:

> In British naval circles, however, the utility of such monster ships is questioned. Logically considered, the carrier is not a fighting ship, but an auxiliary; her prime function is to furnish a floating base for aircraft working with the fleet. Being peculiarly vulnerable to gun fire and other methods of attack, she should keep as far away from the enemy as is consistent with the performance of her special duties. Otherwise the necessity of affording her protection will impose a serious burden on the fighting ships proper. Moreover the sinking or disablement of a carrier such as the *Lexington* or *Akagi* would be a disaster of the first magnitude, since it would deprive the fleet to which she belonged of half its air force at a single blow. Hence the preference in this country for carriers of such moderate dimensions as the *Hermes.* The reconstruction of such comparatively large vessels as the *Glorious* and *Courageous* is probably dictated by motives of economy. Had funds been available, new ships of smaller tonnage would doubtless have been laid down. . . . .

The foregoing quotation, from a highly respected British source, sets forth arguments against very large aircraft carriers. A good many may concur with these arguments. They certainly have some weight. But insofar as they have value, in setting forth the vulnerability of the large carriers, and their need for protection, these are arguments for a battery commensurate with the size of the carrier.

The Chief of the American Navy Bureau of Construction and Repair, before the subcommittee of the House Committee on Appropriations, stated (December 19, 1925) that the revised limit of cost for each of the carriers *Lexington* and *Saratoga,* including planes, was more than forty-four million dollars. This cost also included armor and armament, and ammunition. A further increase of this limiting cost is to be requested by the U. S. Navy Department. In 1925 the "General Board of the United States Navy recommended . . . . the immediate construction of one 23,000 ton carrier." Perhaps this recommendation was signifi-

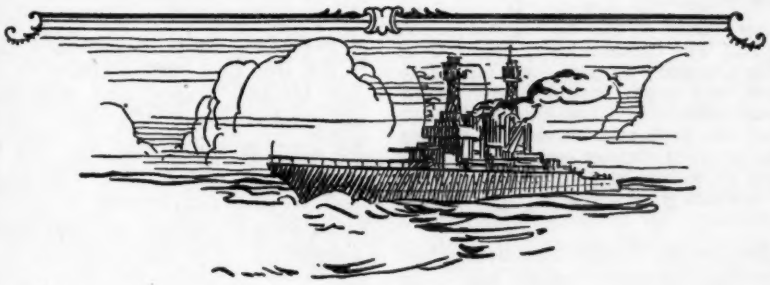
cant. It would hardly be unnatural if misgivings had sometimes assailed the minds of the responsible officials with regard to the large carriers.

Tremendously big and tremendously costly, their security in belligerent service, and even peacetime service, will constitute a big problem for their captains and admirals. The loss of one would be a major fleet calamity. Without armament limitation discriminating adversely against large carriers, the security of those carriers is a serious responsibility. The naval personnel charged with that responsibility did not receive much help from their diplomatic colleagues at the Washington Conference table. Whether any more very large carriers will ever be laid down, at least during the life of Article IX, is a question each can answer as suits himself.

Suppose that a *Lexington* of 33,000 tons and only eight eight-inch guns should lose but seven knots from its maximum speed of 34.5 knots. Speed is a ship's most ephemeral possession, and probably in battle is its most vulnerable characteristic. Such a loss is by no means a far fetched assumption. Then the *Lexington* could be overhauled by an *Akagi* of 26,900 tons, bringing into action ten eight-inch guns against eight eight-inch guns of the *Lexington.*

The *Lexington* could then be sunk by the smaller but better armed *Akagi.* The *Akagi's* best ally would prove to be Article IX of the Washington Treaty. By that article the smaller ship was allowed more of the larger guns.

What then is the verdict? Is Article IX absurd? Is it dangerous to the United States?



The Awakening *in* May, 1917

By CAPTAIN T. G. FROTHINGHAM, *U. S. R.*

THE month of May, 1917, might well be called the month of awakening in the World War. For the month, of which this is now the tenth anniversary, saw the first dawning of the comprehension that the World War had changed into a new and different war—so different that, then and there, the existing means and methods of fighting the World War were suddenly out of date. This is no exaggeration, as two situations followed one another, in 1917 and 1918, for which all former preparations of the Entente Allies were utterly inadequate.

The first of these was the unexpected success of the German campaign of unrestricted *U*-boat warfare, culminating in the appalling destruction of 881,027 tons of shipping in April, 1917. This upset the whole naval strategy of the Entente Allies, and brought about what Admiral Jellicoe called "the gravest danger that has ever faced the empire." The British official *Allied Shipping Control* has summed up this menace beyond any misunderstanding:

> The opening success of this new campaign was staggering. . . . . The continuance of this rate of loss would have brought disaster upon all the allied campaigns, and might have involved an unconditional surrender. . . . . But the black fortnight of April was perhaps a blessing in disguise. The certainty of allied disaster under the existing conditions was so obvious that those who had advocated the institution of convoys were at last given their chance.

Up to this time the British Admiralty had been against the convoy system, but most fortunately a group of officers had worked it out, although it "had hitherto been rejected." Their hands had been strengthened by the new Ministry of Shipping, and afterwards by the fact that Sir Eric Geddes was made Controller of the Admiralty (a new officer) in May, 1917. Admiral Jellicoe, who was then First Sea Lord, has stated:

> The later figures made it clear that some method of counteracting the submarines must be found and found quickly if the allied cause was to be saved from disaster . . . . and in the circumstances the only step that could be taken was that of giving a trial to the convoy system for the ocean trade. . . . . The introduction of the convoy system for the Atlantic trade dates from the early days of May, 1917. Thus at last the new means was being tried, which was destined to turn the scale against German *U*-boats—and it was a strange fact that this new means was a return to the banned system of the old wars.[1]

But it was still a more extraordinary fact that, for the United States, the awakening of May, 1917, went far beyond this, although no one at the time realized it. The government of the United States had soon found that a colossal task confronted our nation in the World War. In the last half of April, French and British special commissions arrived in this country, headed by Joffre and Balfour, respectively. They stated the gloomy situation, which had overthrown all the ill founded optimisms of the Entente Allies. Admiral Sims, from London, had also been giving information of the menace of the *U*-boats, and urging that the United States should send the greatest possible number of anti-submarine craft overseas to assist in the fight against them.

All this had been a complete surprise for the United States, and was an upset for all prewar ideas. In this regard it must be kept in mind that we did not enter a war which was to go on as it had before, and we did not become a part of existing situations of which we had been given information. On the contrary, we entered a new war, of which the Entente Allies themselves had no conception, and, as a result, the Entente Allies had not been in a position to give information of conditions which they did not understand. Consequently there had been very little to go on, very little data upon which to base any definite plans. It can be stated that there was no prewar plan to send destroyers abroad. They were not ready to go overseas and

[1] "A new feature of the means adopted for the protection of trade against submarines has been a return to the convoy system as practiced in bygone wars."—*British War Cabinet Report*, 1917.

there were delays. The confusion among the Entente Allies was reflected by worse confusion in the unprepared United States.

But there were two events in May, 1917, which were astonishingly prophetic in their implications and results. In that month General Pershing had been made Commander-in-Chief of the American Expeditionary Forces, and had sailed for Europe with his staff. In the same month Admiral Gleaves had been designated Commander of Convoy Operations in the Atlantic, and preparations were being made for the first convoy of American troops overseas. At the time, no one could foresee what was to follow in the changed course of the war. But these two events of May, 1917, meant the beginning of the American military reënforcement for the western front in France, which was destined to turn the tide at the crisis of 1918.

For, serious as was the menace of the *U*-boat campaign, it was not the crisis of the World War. This was to come in 1918, after the collapse of Russia had allowed the overwhelming concentration of all the forces of Germany against the Allied armies on the Western Front. It was destined to be the most dangerous assault of the whole World War—far more formidable than the long prepared German attack of 1914. The full menace of this situation of 1918, has not been appreciated by our people. But, in the great 1918 assault, not only were the Germans numerically stronger than they had ever been before,[2] but they also had a new system of infiltration tactics, which proved to be a surprise and broke up the whole intrenched defense of the Allied armies. For these reasons, the culmination of four years of fighting in the World War was destined to be a losing situation for the Entente Allies in 1918—and, to save this situation, a military reëforcement must be provided by the United States on the battlefield of the Western Front, or the war was lost.

This was what no one foresaw in 1917, but we must always keep in mind that, as the danger in 1917 passed, the other, infinitely greater, was impending. All unknown to the world, behind the concealing war clouds, this menace was rolling up to crush the Entente Allies. And we must never forget that the main object of the United States in the World War was determined by this impending danger. That we should help in the fight against the *U*-boats was important. And, though our anti-submarine naval craft were too few and too long delayed, yet Admiral Jellicoe has put it on record that the presence of American destroyers in British waters turned the balance in favor of the extended use of convoys. But the impending menace of 1918, although unsuspected, overshadowed everything else, and the main object of the United States in the World War must be to provide a military reënforcement on the Western Front. The whole outcome of the World War depended upon our ability to deliver this on the battlefield.

The significance of the appointments of General Pershing and Admiral Gleaves in May, 1917, lay in the effects of these two events upon this necessary reënforcement for the Western Front. The wise course of sending the American general and his staff to France, so long before there was any possibility of an American Army, bore fruit in military information sent to this country far in advance of any possessed by the Entente Allies. And this information set the scale of our military effort in far greater proportions than were ever conceived by the Entente Allies. The first command given to Admiral Gleaves, the convoyed transportation of a division of troops sent overseas for moral effect upon the French nation, was the beginning of the greatest transportation of troops over the sea in all history.

In the World War the United States had the great advantage of operating against a contained enemy, and, consequently, we could make preparations for the American reënforcement to the Entente Allies without the necessity of guarding against any serious enemy attacks. However, on the other hand, not only was this demand for our military forces greater than ever expected, but it came under circumstances when a large amount of the transportation must be provided by the United States. Under normal conditions, transportation overseas would have been held a matter of course by means of allied shipping. But the inroads of the *U*-boats had cut down the allied shipping to so great an extent that this was no longer possible. It is true

[2] "Numerically we had never been so strong in comparison with our enemies."—Ludendorff.

that eventually allied shipping transported overseas more American troops than did our own transports,[3] but the fact is not generally known that until May, 1918, almost all of our troops embarked on our own transports. If the United States Navy had not been able to provide this early transportation, our whole effort would have been too late.

When Marshal Joffre was in the United States with the French Commission, he had spoken to the Secretary of War of our "great army which may some day be as great as 500,000 men." This reflected the ideas of 1917 among the Entente Allies. If we had cast our effort on any such scale, we would have scored only failure. It was in this regard that the administration showed wisdom in sending General Pershing so early to France. In contrast to these European ideas, he soon saw a much greater army would be necessary, and, as early as the first part of July, 1917, he had submitted plans for "at least 3,000,000 men." Thus, far ahead of all European calculations, was the administration given the vast scale of the necessary American reënforcement. And, as a result, the American effort, industrial, military and naval, was being cast in this great mold. The importance of this cannot be exaggerated, for, as our effort must be translated into terms of a military reënforcement, it was only by this early military information that our mighty joint operation could be given the right form.

It should be frankly stated that, in every way, we were unprepared—and we would never again allow ourselves to be in the same predicament. That we succeeded is no matter for American complacency—quite the reverse, for only the extraordinary surge of our nation redeemed the faults of our sluggish minds and unready hands. But May, 1917, saw great forces unleashed that had not been measured since the Civil War. In that month Congress, with the urge of the united American people behind it, enacted three measures, unprecedented in their scope, the War Bond Bill, of which the first issue was $7,000,000, the largest Army and Navy bill in the history of nations, and the Selective Service Act, calling upon all men between twenty-one and thirty. These quickly enacted measures meant that the United States had at last entered upon its great task, and the month of May, 1917, saw inscribed upon the wall the writing that foretold the doom of the German Imperial Government.[4]

[3] Transported by Great Britain 49%, by the United States 45%, by other nationalities 6%.

[4] "I will tell you about America. She came into the war at a time when the need of her coming was most urgent. Her coming was like an avalanche. The world has never seen anything like it."—Lloyd George.

The Use *of* Chemicals *in* War

By COMMANDER C. C. BAUGHMAN, *U. S. Navy*

WE ARE all more or less familiar with the general feeling about the use of chemicals in the World War, how people were stunned when Germany first used them in 1915.

We remember how there immediately sprang up very strong wartime propaganda against gas as a war agent, magnified by the ghastly posters, picturing men in the agonies of suffocation, that were placed everywhere before the people. This first gas used was chlorine, the smell of which is familiar to everyone. Chlorine causes strangulation and is necessarily severely painful; one can easily see what a thunderbolt was launched when it was let loose on unprotected and unsuspecting troops on April 22.

It came to the Allies with panic-creating effect. Death heralded by whistling shells exploding with a thunderous crash and with flying splinters of jagged steel, armies have known for decades; but, although in the end comparatively few lives were lost, this change in the method of warfare was a new sensation, and this mysterious death dealing agent seemed to be lurking everywhere. Its advent in the form of silent, invisible gas was new, and therefore had a great psychological effect.

There was the general belief that chemical warfare as developed in the World War was an entirely new method of waging war, however, when we go back into history we find that the Athenians and Spartans, 431-404 B.C., used wood saturated with sulphur and pitch, burning it under the walls to generate poisonous and choking fumes in order to stupefy the defenders. Later, in 360 B.C., pots filled with pitch, sulphur, and other substances were thrown from the walls upon the besiegers. Many other means were used as time went on in the form of incendiary arrows, and later what was known as Greek fire and flame projectors came into use.

In modern times, but prior to the World War, forms of chemical warfare were used by boarding parties during the War of 1812, and an attempt was made to use the same during the Civil War. At the siege of Charleston burning wood saturated with pitch and sulphur was used under parapets in the hope of suffocating and smoking the defenders out.

At the Hague Congress of 1899, whereby all powers except the United States pledged themselves not to use suffocating or poisonous gases, the American delegates were instructed by Secretary Hay against the proposed agreement with regard to asphyxiating shell. He said in part "the expediency of restraining the inventive genius of our people in the direction of devising means of defense is by no means clear, and considering the temptations to which men and nations may be exposed in time of conflict, it is doubtful if an international agreement to this end would prove effective."

Admiral Mahan, one of our delegates to this Congress, expressed himself in part as follows:

> The objection that a machine of war is barbarous has always been raised against new weapons, which were nevertheless finally adopted. In the middle ages it was fire-arms which were denounced as cruel. Later shells, and more recently torpedoes have been denounced. It seems to me that it cannot be proved that shells with asphyxiating gas are inhuman or unnecessarily cruel machines of war, and that they cannot produce decisive results.
>
> I represent a nation that is animated by a lively desire to make warfare more humane, but which may nevertheless find itself forced to wage war; therefore it is a question of not depriving itself through hastily adopted resolutions of means of which it could later avail itself with good results.
>
> It is illogical and not demonstrably human to be tender about asphyxiating men with gas, when all are prepared to admit that it is allowable to blow the bottom out of a ship at midnight, throwing four or fire hundred men into the sea to be choked by water with scarcely the remotest chance of escape.

As we all know, Germany was signatory to this Hague Declaration of 1899. In violating it and using gas she expected to force a speedy conclusion of the war, but as it

turned out she only *added another weapon to modern warfare.*

With this weapon there came the necessity for protection, and in the minds of the Allies the desire for retaliation.

Perhaps one of the most serious errors in policy made by the German general staff during the war was in regard to the proper time to use gas. Twice the war might have been decided against the Allies if the use of gas had been delayed by the Germans until they had a sufficient quantity on hand to use it on a very large scale followed by a general offensive. Instead they employed it experimentally on a small sector, with the result that the Allies were able to provide protective devices.

Primarily this device was a pad saturated with chemicals. Immediately after the first gas attack, the women of England produced 100,000 of these masks or pads within twenty-four hours, upon the appeal of Lord Kitchener.

In the end there is the belief that Germany regrets very much having introduced gas, for with the exception of the German drive in March, 1918, which owed its success to a very large degree to chemicals, the Allies sent over to the Germans about ten times as much gas as they received. As it happened also the prevailing winds were toward the German lines.

Furthermore it is contended that the use of gas was a big factor in ending the war. Up to the signing of the Armistice a very small percentage of American manufactured chemicals had actually reached the front, although the daily production of toxic gases in America at the time exceeded the total daily output of all other countries put together. It is possible that the knowledge on the part of Germany of the vast quantities of gas that were on their way to the front had more or less influence on her decision to seek an armistice and peace.

We are all familiar with chlorine as a commercial product, and among other things its use in a mild concentration as a cure for colds.

At the time Germany first used this there existed the popular impression that she had exercised unusual scientific foresight and capacity, but it must be remembered that chlorine was first discovered in Sweden, 1774. Later the method of producing it by electrolysis was discovered by the British, and its application as a bleaching unit was rendered possible by the French.

As the Allies became more proficient in protecting themselves against chlorine so that the psychological effect of its use became nullified the Germans found the necessity of introducing new agents against which the gas mask and other protective agencies of the Allies were not efficient.

In December, 1915, they disclosed a surprise in the form of phosgene, a more deadly gas but with about the same persistency as chlorine. This gas attacks the lower lungs, but it is not very easy to protect against. In fact the Germans thought that by using phosgene they would win the war, since they did not believe it could be protected against. In this, however, they were again mistaken. The British intelligence service discovered in advance that this was to be used, and when the attack came over the British Army was already equipped with suitable protection.

For some time after this there were few surprises, the interval being used in perfecting the methods of projecting the gases into enemy territory. This ranged all the way from the release of gas from cylinders planted near their own lines allowing the wind to carry the cloud down over the enemy, to mortars, projectors, hand-grenades, and what are known as gas-shells.

Lachrymators, commonly known as tear-gases, were used extensively in many forms, such as chlorpicrin, a persistent gas which besides causing tears is poisonous, and causes extreme nausea. A pet trick was to send over a cloud of this gas which would make men caught unawares quite sick forcing them to remove their masks, so that they were unprepared for the cloud of more deadly gas, phosgene, which followed soon after.

And now I will touch on one more agent, the king of them all, mustard. This gas was called mustard by the British soldiers because of its burning effect on the skin, and of its odor. This is not a mustard oil, but an artificial compound, and was first used in July, 1917, by Germany.

This event marked the great milestone in the development of chemical warfare. Although protection against inhalation was available in the regular gas-mask, over 6,000 casualties occurred because the British were not familiar with the properties of the new

gas, and because due to the faint odor they were not aware of its presence. Here again the Germans covered but a small sector, thereby losing another opportunity to obtain decisive results.

From that time on mustard gas developed into one of the biggest problems of the war, as one can easily realize since at ordinary temperatures mustard is an oily liquid a few drops of which on the sole of one's shoe, puttee, or clothing may cause a casualty.

An illustration of this in recent times is provided by the case of an officer who was taking the regular chemical warfare course at Edgewood arsenal.

During some practical demonstrations in the open to show the students how the gases appeared, and what they smelled like, one officer, without realizing it, accidentally kicked over a small test-tube containing liquid mustard.

A little while later one of the instructors discovering that the tube had been knocked over, immediately endeavored to find out who had done it, since he realized the possibility that whoever had might receive a bad burn.

By process of elimination the officer was finally discovered, and immediately sent to his home a few hundred yards away to change his clothing as quickly as possible.

The accident occurred at about three o'clock in the afternoon, and he felt no effects until about six thirty. As the result of a few drops of mustard splashed unnoticed on this officer's puttees he received several bad burns, which caused him to remain in the hospital for several weeks.

When one realizes that this chemical can be projected in bombs or shells, or sprinkled on the ground where it will remain at ordinary temperatures in small droplets like dew, rendering an area untenable and dangerous to passage, you hesitate to do otherwise than treat it with great respect.

All energies of the Allies were concentrated upon the education of the troops in the properties of mustard, and method of protection against it, and, upon the production of protective devices.

Experiments were immediately begun with a view to manufacturing mustard in large quantities, but not until eleven months later were shells containing this gas fired by the Allies.

During the World War approximately thirty per cent of the total American casualties were from gas. Of this percentage only two per cent died, whereas twenty-four per cent of the other combined casualties died.

Now that the war has been over for a few years it is a matter of record that the permanent injuries sustained by gas casualties who recovered are practically nil in comparison to those sustained by casualties from other sources.

Materials which can be used for the manufacture of war chemicals are in constant demand in the commercial world, and are always at hand. The United States has the raw materials, the chemical industries, and therefore the facilities needed for the production of chemical agents. Consequently it only seems logical that in order to insure ourselves against surprise by another nation we should push forward our research work, not only in regard to agents that might be used, but in protective devices as well.

A great many parts of the world have the materials for manufacturing chemicals, utilized in peace times for the making of dye stuffs. As a result of the use of poison gas in the last war and this availability of materials, all the principal nations are carrying on some form of preparation for chemical warfare as a part of their national defense scheme. This does not indicate any intention on their part to wage war any more than do their other military preparations, but it does show that they have accepted the advent of chemicals as a method of carrying on war.

According to recent accounts it is interesting to note that Russia, in particular, has organized a complete chemical warfare arm, and is developing it on a large scale, larger than any other country.

Our own interest in this matter is centered in a separate branch of the Army called "Chemical Warfare Service" with its research work, manufacturing plant, and school, centered at Edgewood arsenal, Edgewood (near Baltimore), Maryland. At Edgewood not only activities for the Army are carried on, but those for the Navy as well.

There is attached to the arsenal a naval unit composed of two line officers, a marine officer, and a medical officer, the senior line officer being in command of the unit. In addition to working on naval problems the junior line officer and the marine officer are instructors in the school. The medical officer is associated with the research work.

All gas masks, protective clothing, and other materials of like nature are manufactured or prepared by the arsenal for the use of the Navy. Through the activities of the naval unit at Edgewood, under fleet training, all experiments and training in the Navy are carried out.

During the World War the Navy of course escaped the experience of actually using poison gas, although it is said that some gas shells were used in the Battle of Jutland. It was not known by the British at the time, however, because the Germans had simply taken high explosive shells and replaced a part of the explosive by a lead canister filled with chemical. The explosion was so great that the liquid was decomposed, therefore no effect was produced. Authorities, however, raise the question of this use, so that gas as a factor at the Battle of Jutland cannot be accepted as authentic.

Developments have up to the present time progressed to a point where it is not only possible but probable that chemicals would be used in naval warfare. Consequently we must not forget either the value or possibility of using chemicals in problems which involve the combined operations of the Army and the Navy, the securing and holding of advanced bases, the silencing of land fortifications, and the neutralization of areas on shore.

The Navy must not only be prepared to use chemical agents in time of war, but it is far more important that she be thoroughly capable of protecting herself against their use by a possible enemy. For some time we have all been quite familiar with the *presence* of gas masks aboard ship, but further than that it is doubtful whether the service as a whole is entirely familiar with their use, how they should be cared for, or their importance as a method of protection.

Many times during the war when gas was first used there were unnecessarily heavy casualties because the men would not carry out their instructions. Later as gas discipline became much better among the troops, the casualties resulting from gas attacks were materially reduced.

In order to bring the naval service into closer contact with the subject of chemical warfare, and to have in the Navy officers who are able to more readily aid in bringing it up to a logical state of preparedness against chemical agents, the Navy Department each year sends several groups of officers to Edgewood for a six weeks' course at the school. Each group is composed of from twenty to thirty officers.

When we realize that the art of using chemicals has progressed to the point where ships are subject to being sprinkled with mustard, or attacked with gas bombs from the air, enveloped by a poison gas cloud, or perhaps hit with a gas filled shell likely to explode in a closed compartment, it seems time that we give the subject a great deal more than just a little thought. Were any of these things to happen to any of our capital ships at the present time how good would be the gas discipline, and how efficient would be the protection, and the work of the clean-up squads afterwards?

Farragut *and* Mobile Bay—Personal Reminiscences

By THE LATE REAR ADMIRAL JOHN C. WATSON, *U. S. Navy* (RETIRED)

EDITOR'S NOTE: This paper was read by Rear Admiral John C. Watson, U. S. Navy, to his comrades of The Loyal Legion at a meeting in 1916. It is considered to be one of special interest because the author was one of the last who could give personal recollections of Admiral Farragut. Admiral Watson served as aide to Admiral Farragut and his reminiscences are the more impressive because of their intimacy. A bust of Farragut will be unveiled in the Hall of Fame, New York University, May 5.

I MOST heartily wish that all his fellow countrymen—you companions especially—could have known that noble American seaman, David Glasgow Farragut, who was trained from his early boyhood to give to his country the very best service of which he was capable. When Flag Officer Farragut hoisted his flag on the *Hartford* at the Philadelphia Navy Yard in January, 1862, I was a master in the Navy and navigator of that ship. On being presented to him, in company with the other officers, he took me a little aside and told me, in the kindest possible way, that he was sorry to have to tell me I was not to remain on the *Hartford,* but was to be relieved by another master (a grandson of Mr. Crittenden). His kind sympathy touched me, and I smilingly told him I was that fortunate master who would sail aboard his flagship, and hoped and trusted that with the discharge of my duties I would win his confidence. At that time Farragut was over sixty years of age, but was remarkably active and alert, both bodily and mentally. He was just about my height and build, though after the summer of 1864 he grew much stouter. Up to that year he had on several successive birthdays tested his suppleness by holding with his right hand his left foot by the toe of the left shoe while he hopped through a bight or loop, forwards and backwards. He was a most accomplished fencer, and was not averse to testing his skill with the single stick against the most proficient seamen on board. When he spent an evening on shore he always wore his sword, feeling perfectly confident of his ability to protect himself with it from possible attacks in passing through the slums or along the wharves. Farragut was a very religious man. He loved to have me read to him from the Bible. He made it very evident that he always believed the issue was with God, while recognizing that he must do his best.

Farragut had a very high sense of duty, but at the same time he was considerate to those under him, as is shown by the following incidents: The *Sebago,* commanded by Lieutenant Commander Fitzhugh, was one of the vessels selected to take part in the Battle of Mobile Bay, but she was injured in collision, so that the Admiral decided not to let her go in. After this decision had been announced, Fitzhugh besought me, almost with tears in his eyes, to beg the Admiral to let him take part. I made the request, and Farragut answered that he deeply sympathized with Fitzhugh's desire to be in the battle, but he had to consider the public interest, and this required that only the most efficient ships be used. On receiving a jeweled sword, which was presented to him by the Union League Club of New York for his brilliant services to the Union, he sent it forward for the crew to see, with the message that they had helped him to earn it.

In this connection my heart swells with joy and pride when I recall (in proof of the fact that I had won the Admiral's confidence by my discharge of the duties he entrusted to me as his confidential aid) the affection which he expressed for me. He once wrote to his son: "I am almost as fond of Watson as of yourself."

It was not very long after the capture and occupation of New Orleans that Farragut urged the seizure and occupation of Mo-

bile Bay. He believed an inside blockade was the only absolutely efficient blockade. Furthermore, he thought the moral effect of the recent successful passage of the Mississippi River forts would count for a good deal, especially before the bay forts were strengthened. Farragut informed General Butler that he was willing to undertake to pass in and hold the lower bay if Butler would assist with even so small a force as 1,000 or 1,500 men. He never had the slightest doubt of being able to pass inside the bay and cut the forts off from the upper bay and city; but fully realized that as long as Forts Powell and Gaines prevented supplies reaching his ships he would be compelled, in a comparatively short time, to pass out again under the fire of Fort Morgan. General Butler was always willing to coöperate, but did not have sufficient troops to spare for this expedition. Banks, who succeeded Butler, considered it necessary first to occupy places on the Mississippi, and the Red River expedition was given precedence, contrary to General Grant's judgment. Official correspondence shows that Generals Canby and Gordon Granger were also willing to coöperate with Farragut as far as lay in their power. As time passed, Farragut became very urgent that Mobile Bay be taken and held, because of a credible report that the Confederates had built one ironclad at Selma and were building another. As a matter of fact, they had built one—the *Tennessee*—which, after most discouraging difficulties and disasters, was finally floated over Dog River bar on May 20, 1864, and brought to anchor under the guns of Fort Morgan, where she was observed flying the flag of the Confederate Admiral, Franklin Buchanan. Her officers soon found she was unseaworthy and so slow and sluggish in her movements, even in smooth water, as to be a failure as a ram. They concealed these facts, however, from their own people, as well as from the enemy. The Confederate newspapers were claiming that the *Tennessee* would go out and sink the blockaders or drive them away. Farragut's correspondence shows his eagerness for her to come out while he was on the spot, as he was firmly convinced that in a seaway he could destroy her with his heavy ships. After weeks of futile waiting for the *Tennessee* to come out he had to leave the blockade temporarily, and became exceedingly anxious to go in, provided he could have at least one monitor which would be able to follow the *Tennessee* in case she remained in shoal water where the heavy ships could not reach her. At last four monitors were promised him, and they were due at Sand Island not later than August 3. So it was arranged that the Union troops, under General Granger, were to land behind Fort Gaines on the afternoon of the third and threaten it, and that the fleet should attack the morning of the fourth. One of the monitors, the *Tecumseh,* accompanied by the *Richmond,* did not arrive until about sunset the afternoon of the fourth, in spite of the utmost efforts of her commander (Commander T. A. M. Craven) and of Captain Thornton A. Jenkins, of the *Richmond,* commanding the second division of the fleet, to get her away from the Pensacola Navy Yard, prepared to take her part in the battle. This delay caused Farragut much mortification. The soldiers certainly got ahead of the sailors that time. As soon as the *Tecumseh* appeared I went aboard of her, delivered to Commander Craven the Admiral's instructions for the battle, and guided her to her anchorage. In the meantime, a party of army signal officers arrived, and were distributed among the heavy vessels of the fleet. First Lieutenant J. C. Kinney, Thirteenth Connecticut, was assigned to the *Hartford,* and he has written a most interesting and detailed account of the bay fight, called "An August Morning with Farragut," which appeared in the *Century* for May, 1881, and which has since been revised and extended in *Battles and Leaders of the Civil War.*

An early breakfast was ordered for the next morning, August 5, and by five o'clock the seven smaller vessels which had been selected as consorts to the heavy ships had moved alongside of them, and about five-thirty, when they had all been securely lashed in pairs, the Admiral, who was just finishing breakfast, directed Captain Drayton to signal the fleet to take the stations assigned and move in, in obedience to instructions. I made the necessary signals. The ships got their positions very slowly, because of a slight haze, and proceeded in accordance with General Orders No. 10 and No. 11. The fleet was arranged in the following order, the monitors being slightly in advance and on the starboard side of the wooden ships:

Octorora,
Lt. Comdr.
C. H. Green.
Metacomet,
Lt. Comdr.
James E. Jouett.
Port Royal,
Lt. Comdr.
Bancroft Gherardi.
Seminole,
Comdr.
J. Donaldson.
Kennebec,
Lt. Comdr.
W. P. McCann
Itasca,
Lt. Comdr.
George Brown
Galena,
Lt. Comdr.
Clark H. Wells.

Brooklyn,
Capt.
James Alden.
Hartford,
Capt.
Percival Drayton
Richmond,
Capt.
Thornton A. Jenkins
Lackawanna,
Capt.
J. B. Marchand.
Monongahela,
Capt.
J. H. Strong.
Ossipee,
Capt.
W. E. LeRoy.
Oneida,
Comdr.
J. R. M. Mullany.

Tecumseh,
Comdr.
T. A. M. Craven.
Manhattan,
Comdr.
J. W. A. Nicholson.
Winnebago,
Comdr.
T. H. Stevens.
Chickasaw,
Lt. Comdr.
G. H. Perkins.

The *Brooklyn* was given the honor of leading the column, in deference to the almost unanimous opinion of the commanding officers of the fleet, because she carried four heavy chase guns and an ingenious arrangement for picking up torpedoes. Farragut was loath to give up the leading position, believing that rank carried with it corresponding responsibility, but he finally yielded, for the above reasons.

General Order No. 10 was as follows:

Strip your vessels and prepare for the conflict. Send down all your superfluous spars and rigging. Trice up or remove the whiskers. Put up the splinter nets on the starboard side, and barricade the wheel and steersmen with sails and hammocks. Lay chains or sand bags on the deck over the machinery, to resist a plunging fire. Hang the sheet chains over the side, or make any arrangement for security that your ingenuity may suggest. Land your starboard boats or tow them on the port side, and lower the port boats to the water's edge. Place a leadsman and the pilot in the port quarter boat. The ships will run past the forts in couples, lashed side by side, as hereinafter designated. The flagship will lead and steer from Sand Island N. by E. by compass until abreast of Fort Morgan, then N.W. half N. until past the Middle Ground, then N. by W., and the others, as designated in the drawing, will follow in due order until ordered to anchor; but the "bow and quarter-line" must be preserved to give the chase guns a fair range, and each vessel must be kept astern of the broadside of the next ahead. Each vessel will keep a little on the starboard side of the next ahead, and when abreast of the fort will keep directly astern, and, as we pass the fort, will take the same distance on the port quarter of the next ahead, to enable the stern guns to fire clear of the next vessel astern. It will be the object of the admiral to get as close to the fort as possible before opening fire. The ships, however, will open fire the moment the enemy opens upon us. Use short fuses for the shell and shrapnel, and, as soon as within 300 or 400 yards, give them grape. If one or more of the vessels be disabled, their partners must carry them through, if possible; but if they cannot, the next astern must render the required assistance, but, as the admiral contemplates moving with the flood tide, it will only require sufficient power to keep the crippled vessels in the channel. Vessels that can must place guns on the poop and topgallant forecastle and in the tops on the starboard side. Should the enemy fire grape, they will remove the men from the topgallant forecastle and poop to the guns below until out of grape range. The howitzers must keep up a constant fire from the time they can reach with shrapnel until out of its range.

General Order No. 11:

Should any vessel be disabled to such a degree that her consort is unable to keep her in her station, she will drop out of line westward and not embarrass the vessel next astern by attempting to regain her station. Should she repair damages

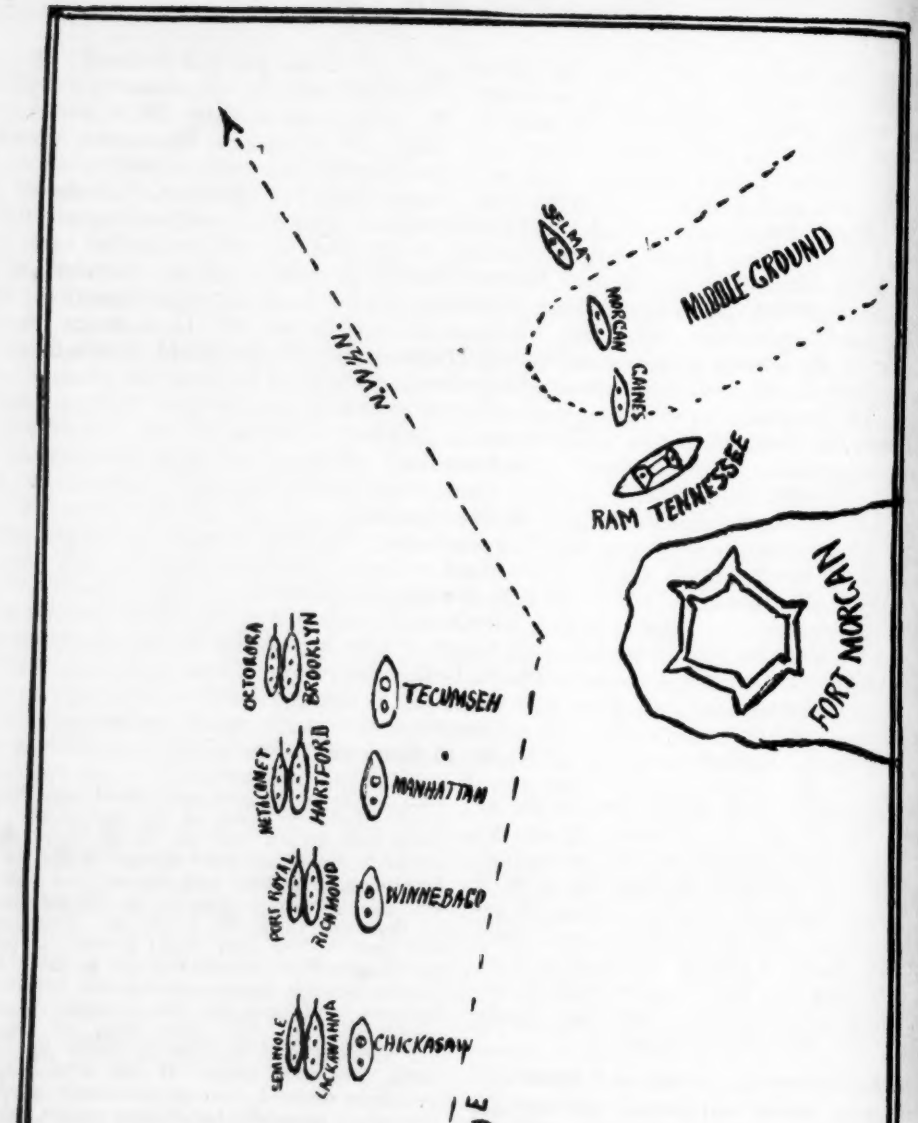


Diagram sent by Admiral Farragut to the Secretary of the Navy with his report of the battle of Mobile Bay

so as to be able to re-enter the line of battle, she will take her station in the rear, as near to the last ship as possible. So soon as the vessels have passed the fort and kept away to the N.W., they can cast off the gunboats at the discretion of the senior officer of the two vessels, and allow them to proceed up the bay and cut off the enemy's gunboats that may be attempting to escape. There are certain black buoys placed by the enemy across the channel from the piles on the west side of the channel toward Fort Morgan. It being understood there are torpedoes and other obstructions between the buoys, the vessels will take care to pass to eastward of the easternmost buoy, which is clear of all obstructions. The admiral will endeavor to remove the others before the day of attack (as he thinks they support what will otherwise sink), and at least to destroy them for guides to the demons who hope to explode them. So soon as the vessel is opposite the end of the piles, it will be best to stop the propeller of the ship and let her run in with her headway and the tide, and those having side-wheel gunboats will continue on with the aid of their paddles, which are not likely to foul with their drag-ropes.

Before General Order No. 11 was issued, Farragut had the carpenter make some little wooden blocks, shaped like boats, with which he experimented on a table or board, on which the points of the compass were traced, to determine the best position of the vessels with reference to each other in entering the bay. I used to help him maneuver the little blocks so as to concentrate and maintain as heavy a fire as possible upon Fort Morgan when we should be going in, and also, after these General Orders were issued, we played with the blocks preparatory to practicing the ships in keeping close order when under way, at varying speeds.

Finally, after the completion of all details and the fleet was ready, about 6:45 A.M. of this glorious August 5, the *Tecumseh* fired a scaling shot from each of her two fifteen-inch guns and then loaded each of them with the heaviest charge and a solid shot in anticipation of attacking the *Tennessee*. The ships drew slowly ahead, assisted by the young tide. Fort Morgan opened fire about 7:10 A.M., and the *Brooklyn* replied almost immediately with her bow-chasers, the other ships opening with their guns as soon as they would bear. All went well until about seven-thirty o'clock, when the *Brooklyn*, having drawn ahead of the two river monitors, suddenly stopped, arresting the advance of the fleet. This threatened the most serious disaster, as the flood tide was sweeping the ships together in confusion under the guns of the Confederate batteries. At the beginning of the action, Farragut was standing in the port main rigging on the sheer pole, just on a level with the hammock netting and quite near the commanding officer of the *Metacomet*, Jouett, who was standing on her starboard paddle box. He had gradually mounted higher and higher as the smoke grew denser, until he found himself in the futtock shrouds, just under the main top, where he was secured by a lashing, which Knowles, the signal quartermaster, carried up to him by direction of Captain Drayton. From this position Farragut hailed the deck to know why the *Brooklyn* had stopped. He was told she had signaled that she was forging ahead of the monitors. He ordered a signal made to her to signal the monitors to go ahead and to go ahead herself; this signal was made by Lieutenant Kinney by wig-wag. Instead of going ahead, the *Brooklyn* was soon seen to be backing, and in doing so her bow swung across the bow of the *Hartford*, closing the narrow passage to the east of the line of torpedoes. Farragut hailed again, and all that could be distinguished of her reply was something about torpedoes. I was standing on the poop deck at the time, and heard the Admiral shout, on the instant, it seemed: "Damn the torpedoes! Full speed ahead, Drayton! Hard a starboard! Ring four bells! Eight bells! Sixteen bells!" I think he also called to Commander Jouett, of the *Metacomet*, to back, for she did so. By this movement we all knew that Farragut had decided suddenly to cross the torpedo field, which he had forbidden any of the ships to do. Some of us expected every moment to feel the shock of an explosion under the *Hartford* and to find ourselves in the water. In fact, we imagined that we heard some caps explode. If so, they failed to explode the torpedo, for we passed through the field in safety. Then there was a race between the *Brooklyn* and the *Richmond* as to which should be the first to follow the *Hartford*. The rest of the fleet followed in their wake, and probably no straighter course was ever kept than by these ships in passing over that torpedo field, the furrow made by the *Hartford* being accurately followed. Although this action of Farragut's seemed instantaneous, we learn from letters to his family that he had found time to ask God for guidance, and he believed he heard a voice say, "Go on!" On several previous occasions he had said to me that inevitably many of the torpedoes were leaky and would not explode, and a good

many had probably drifted from their moorings.

In the meantime the *Tennessee* and the three other Confederate vessels had taken up positions inside the bay so as to rake the Union fleet as it changed its course in entering the bay. This took them inside of, but to the west of, the eastern red buoy. In her eagerness to attack the *Tennessee,* the *Tecumseh* put her helm to starboard and headed directly for her, her course taking her to the west, or wrong, side of this buoy. When she was within 200 yards of the *Tennessee* she was seen to reel and then plunge headfirst to the bottom. This disaster occurred just after the *Brooklyn* had begun to back. Some of the *Hartford's* crew raised a cheer, thinking it was the *Tennessee* which had been sunk; but Farragut, who had seen the accident, ordered Jouett to lower a boat and pick up any survivors.

My admiration for the Admiral knew no bounds when I realized that this appalling disaster had not affected his decision to cross the torpedo field. As the fleet was steaming up the bay, after passing Fort Morgan, the *Monongahela* rammed the *Tennessee* on her port quarter, but the ram put her helm to starboard and it was only a glancing blow. The *Tennessee* poured a destructive broadside into the last ships of the fleet and then steamed to her anchorage under the guns of the fort.

While the fleet was anchoring up at the northern end of the lower bay in obedience to orders from the flagship, Captain Drayton reported to the Admiral, who was standing near me on the poop deck, that the ram was under way and going out to sink the vessels left outside. Drayton was ordered to get the *Hartford* under way at once and follow her out. I confess that I heard this order with consternation, as it meant that we would have to run the gauntlet of the guns and torpedoes again. Farragut was soon convinced by observation that the ram was heading for us, and he was impatient for the *Hartford* to get under way. I was ordered to signal the heavy ships in succession: "Destroy the enemy's principal ship by ramming her," which was followed later by a general signal to the same effect. These signals were also wigwagged by the army officers on board. The *Monongahela* and *Lackawanna* did ram the *Tennessee,* but without effect, and she continued to head straight for the *Hartford.* We had barely hove our anchor up when, under four bells, we tried to ram her. She put her helm to starboard, so the blow was only a glancing one, the two ships rasping along each other's sides in opposite directions. We gave her a broadside of solid nine-inch shot, but they had not the slightest effect on her. Just before striking her, Farragut jumped into the port mizzen rigging, above the poop deck, being eager to see the effect of the ramming. He laughed at my remonstrances as I seized the tails of his frock-coat and tried to prevent him from getting up there. I then caught up the end of the spanker vang, a small rope that happened to be handy, and, with his consent, secured him to the mizzen shrouds. I stood near him, just inside the rigging on the poop with a drawn revolver, ready to get the drop on anybody aboard the ram who might try to pick him off. Her shells exploded on our berth deck, killing and wounding some of the powder division, but doing no serious damage to the ship. Shortly after this the ram's smokestack, which was already badly riddled was broken off above the casemate when the *Lackawanna* struck her a second time, and the three monitors also punished her severely, the *Chickasaw* carrying away her steering gear and the *Manhattan* and *Winnebago* penetrating her casemate and jamming her port-shutters. Admiral Buchanan was wounded in the leg by one of these shots. She was now lying like a log in the water, and there was nothing left for her to do but to surrender, which she did as the *Ossipee* was about to ram her.

I failed to mention that as soon as we had passed inside of the three lines of torpedoes Jouett was permitted to cut and cast off the lashings which secured the *Metacomet* to the *Hartford* and to chase the *Selma,* and, in obedience to orders, I made general signal: "Gunboats chase enemy gunboats." The *Metacomet* soon captured the *Selma* after a gallant fight, the *Gaines* was driven ashore near Fort Morgan in a sinking condition, and the *Morgan* escaped with comparatively slight damage, a passing bank of fog contributing materially to their escape from capture by our gunboats.

One of the most gallant things done that day was the handling of the *Metacomet's* boat by Acting Ensign Nields when he was sent to pick up the survivors of the *Tecumseh,* exposed to the broadside of the *Brooklyn* and the whole Confederate fire.

I was very much impressed by the fact

that the character of the danger which we had to face in going into Mobile Bay had a markedly sobering effect upon the boldest and most daredevil among us. From the Admiral's detailed report, dated Mobile Bay, August 12, 1864, I quote in this connection: "Regular discipline will bring men to any amount of endurance; but there is a natural fear of hidden dangers—particularly when so awfully destructive of human life as the torpedo—which requires more than discipline to overcome."

I shall now quote two general orders, issued on August 6 and 7, after the surrender of Fort Gaines, as they throw additional light upon the character of this great man.

General Order, No. 12. Mobile Bay, August 6, 1864.

The admiral returns thanks to the officers and crews of the vessels of the fleet for their gallant conduct during the fight of yesterday.

It has never been his good fortune to see men do their duty with more cheerfulness and courage; for, although they knew that the enemy was prepared with all devilish means for our destruction, and though they witnessed the almost instantaneous annihilation of our gallant companions in the *Tecumseh* by a torpedo, and the slaughter of their friends, messmates and gunmates on our decks, still there were no evidences of hesitation in following their commander-in-chief through the line of torpedoes and obstructions, of which we knew nothing except from the exaggerations of the enemy, who had given out that we should all be blown up as certainly as we attempted to enter.

For this noble and implicit confidence in their leader, he heartily thanks them.

D. G. Farragut,
Rear Admiral Commanding
W. G. Blockading Squadron

General Order, No. 13:

The admiral desires the fleet to return thanks to Almighty God for the signal victory over the enemy on the morning of the fifth instant.

Historic Ships *of the* Navy—*Hartford*

By ROBERT W. NEESER

THE *Hartford* is one of the second-rate screw sloops authorized by the Act of Congress approved March 3, 1857. She is a wooden steamer of 2,790 tons displacement and 1,900 tons burthen, with the following dimensions: length, 225′; breadth, 44′; depth of hold, 18′; draft, 17′. She was built by the government at the Boston navy yard, where she was launched November 23, 1858. Her cost was $502,650.16. She was originally fitted with a direct acting two-cylinder jet condensing engine of thirty-four-inch stroke, driving a single screw, for which steam was supplied by two Martin boilers. The screw was of bronze, two-bladed, and fourteen feet in diameter.[1] Her maximum speed under steam alone was 9.5 knots. In 1880 the *Hartford* was fitted with new machinery, the engines put in being a pair of Isherwood horizontal compound engines of 785 horsepower and forty-eight-inch stroke,[2] while the old boilers were replaced by two main vertical tubular boilers of more modern design. Her bunker capacity was 260 tons of coal. During the period of her war service, her complement was thirty-four officers and 280 men.

When first commissioned, the *Hartford* carried a battery of sixteen nine-inch shell guns, but on the outbreak of the Civil War their number was increased to twenty, with two rifled guns and two light howitzers. On March 3, 1862, she received two additional nine-inch guns. In the following year she mounted twenty-four nine-inch, two thirty-pounder Parrott rifles, and one rifled forty-five-pounder. On March 31, 1864, her armament comprised two, one hundred-pounder Parrott rifles, one thirty-pounder rifle, and eighteen nine-inch smoothbores. In September, 1872, she mounted two eleven-inch and sixteen nine-inch smoothbores, two heavy twenty-pounder rifles, and five pieces of smaller caliber. In May, 1882, she was given a more modern armament consisting of one eight-inch muzzle-loading rifle, twelve nine-inch guns, and one sixty-pounder breech-loading rifle, with a secondary battery of two twenty-pounder rifles, two three-inch howitzers, four Hotchkiss revolving cannon and one forty-five caliber Gatling gun. The last change in her armament was made in September, 1899, when she was given thirteen five-inch rifles, eight six-pounders, four one-pounders, with three lighter guns.

The *Hartford* was placed in commission at the Boston navy yard in June, 1859, by Captain Charles Lowndes, and made her first cruise in Asiatic waters as the flagship of Flag-Officer Stribling commanding the East India Squadron. On the outbreak of the Civil War, she was ordered home, reaching Philadelphia, Pennsylvania, in the summer of 1861. When Captain David G. Farragut was appointed to the command of the West Gulf Blockading Squadron, which was to effect the "reduction of the defences guarding the approaches to New Orleans, and the taking possession of that city," the *Hartford* was designated as his flagship. Her commanding officer was Commander Richard Wainwright, and on January 20, 1862, she stood down the Delaware on what was to be one of the most brilliant cruises in history. "She was the admiration of all who could see beauty in a ship," wrote one of her officers, and "Farragut was enthusiastic about the vessel," as many of his letters show.

The *Hartford* reached Ship Island in Mississippi Sound on February 20. With the exception of the vessels already employed on the blockade, the flagship was the first to arrive of the force destined to make the move up the river. One by one they came, and were gradually assembled at the South

[1] This was replaced in 1880 by a more efficient four-bladed screw, the original one being diverted to a lasting and appropriate use by being melted and cast into the statue of Admiral Farragut, which stands in Farragut Square, Washington.

[2] These engines were built by Harrison Loring of Boston, at a cost of $114,400, and were originally intended for a sloop that was never completed—the *Kewaydin*.

West Pass. Those whose draft permitted, entered at once; but the heavy deposits of mud brought down by the Mississippi formed a bar at the entrance of each pass, preventing the ingress of the larger ships. "I am up to my eyes in business," wrote the flag officer on March 10. "The *Brooklyn* is on the bar, and I am getting her off. I have just had Bell up at the head of the passes. My blockading shall be done inside as much as possible. I keep the gunboats up there all the time." The *Pensacola* made five different attempts to enter before she was able to get into the river, but the forty-gun frigate *Colorado,* which the Navy Department had intended to participate in the attack, was obliged to remain outside.

The squadron assembled in the river consisted of four screw sloops, one side-wheel steamer, three screw corvettes, and nine screw gunboats, in all, seventeen vessels, carrying, exclusive of brass howitzers, 154 guns. Twenty mortar schooners, under the command of Commander David D. Porter, accompanied the expedition. In accordance with the flag officer's instructions, the vessels were carefully prepared for river service. They were stripped to the topmasts. All spars and rigging that could be spared were sent ashore. Everything forward was brought close in to the bowsprit, so as not to interfere with the forward range of the battery. Guns were mounted on the poop and forecastle, and howitzers placed in the tops. The ships were ordered trimmed by the head, so that if they took the bottom at all it would be forward. The logs of the squadron show constant bustle and movement, accompanied by frequent collisions, owing to the swift current of the river, which was at that time exceptionally high. A hospital was established on shore at Pilot Town, but medical supplies were none too plentiful, and in his letters the flag-officer complained of the "want of everything in the line of munitions of war." Even fuel was lacking, but the coal vessels "arrived just in time to enable me to go ahead."

The only serious obstacle to the upward progress of the fleet was at Plaquemine Bend, twenty miles from the head of the passes, and ninety below New Orleans. Two permanent fortifications existed at this point, one on the left or north bank of the stream, called Fort St. Philip, the other on the right bank, called Fort Jackson. The first named consisted of a quadrangular earthwork with brick scrap, rising nineteen feet above the level of the river, and mounting four eight-inch columbiads and one twenty-four-pounder. Two water batteries flanked the main work, the upper having sixteen twenty-four-pounders, and the lower twenty-one guns of various caliber. Fort Jackson was a work of even greater importance. It was a pentagonal casemated fortification, with two ten-inch and three eight-inch columbiads, one seven-inch rifle, six forty-two-pounders, fifteen thirty-twos, and thirty-five twenty-fours. Just outside, and covering the approach to it, was a water battery mounting five guns. Chain and log obstructions were streched across the river, while above the Confederates had assembled thirteen gunboats, including the ram *Manassas* and the incomplete ironclad *Louisiana.*

On April 8, a detachment of the coast survey proceeded up the river and began a minute examination of the river banks, with a view to selecting the best positions for the mortar vessels. The work of the surveyors was carried on under the guns of the forts, and often exposed them to the fire of riflemen concealed in the bushes. On the sixteenth the fleet anchored just below the intended position of the mortar schooner, and two days later Commander Porter reported everything ready. At ten A.M. the bombardment began, and for five days and nights it continued with undiminished vigor. The testimony of the Confederate officers is unanimous as to the singular accuracy of the mortar fire. A large proportion of the shells fell within the walls of Fort Jackson. The quarters and citadel were destroyed, and the magazine endangered. The garrison were compelled to live in the casemates, which were partly flooded from the high state of the river and the cutting of the levee by shells.

Mortar firing, however good, would not reduce the forts, nor compel the surrender of New Orleans. It was necessary to pass above, and this, Flag Officer Farragut now proceeded to do. At two A.M. on April 24, the flag-ship made the appointed signal and the leading column weighed. The *Cayuga* was the first to pass through the booms. In regular order followed the *Pensacola, Mississippi, Oneida, Varuna, Katahdin, Kineo,* and *Wissahickon.* The *Hartford* led the second division of the fleet. According to the report of Commander Wainwright, she was engaged only twenty minutes after the

enemy opened on the leading vessels of the first column. She sheered in near to Fort Jackson, "receiving a galling fire from both forts," and in endeavoring to clear a fire raft coming down on her she took the ground close under Fort St. Philip. The ship caught fire, the flames bursting through the ports and running up the rigging; but the discipline of her crew prevailed over the fury of the element, and the *Hartford* worked herself clear, her guns keeping up a heavy fire on both forts all the time.

At daybreak Flag Officer Farragut found himself above the forts, with fourteen of the seventeen wooden ships he had started with the night before. The enemy's flotilla was dispersed or destroyed. The Union fleet anchored for the day at quarantine. The Chalmette batteries attempted to check the advance of the leading ships, but they were soon silenced by the discharge of the *Hartford's* broadsides, and, at noon on the twenty-fifth, the vessels anchored before the city. The levee was a scene of desolation and of the wildest confusion. Cotton, coal, steamboats, ships, were ablaze, and it was not without difficulty that the victors avoided sharing the calamity. Among the shipping thus destroyed was the *Mississippi,* a powerful ironclad, which the rapid movements of the Union fleet prevented from escaping up the river. The United States flag was hoisted on the mint by Captain Bailey, but the next day it was hauled down by a party of citizens. Flag Officer Farragut thereupon landed a battalion of marines, accompanied by a howitzer battery, and this force overawed the population until General Butler arrived on the evening of May 1, when the city was turned over to his care.

Following up his advantage, the flag officer sent seven gunboats, under the command of Captain Craven of the *Brooklyn,* up the river. Baton Rouge and Natchez surrendered on being summoned; but at Vicksburg the Union commander was met with a refusal. "The Government officials appear to think we can do anything," wrote Flag Officer Farragut. "They expect me to navigate the Mississippi, nine hundred miles, in the face of batteries, ironclad rams, etc.; and yet, with all the ironclad vessels they have north, they could not get to Norfolk or Richmond. The ironclads, with the exception of the *Monitor,* were all knocked to pieces. Yet, I am expected to take New Orleans, and go up and release Foote from his perilous situation at Fort Pillow, where he is backed up by the Army and has ironclad boats built for the river service, while our ships are in danger of getting aground and remaining there till next year." "We have no pilots," he wrote to Secretary Welles on May 30, 1862. "We take the boatmen who go up in the steamers or flat boats, and generally have to force them, but they know little or nothing of the river's depth or channel for vessels of our draft." In fact, the Confederates exulted in seeing the larger ships go upstream, as they were confident none would ever again float in salt water.

But the orders of the Navy Department to "clear the Mississippi" were peremptory, and, like the true seaman he was, the flag officer proceeded to carry them out to the best of his ability. The *Hartford* joined the fleet below Vicksburg on June 25. The position was by nature the strongest on the river. Twenty-six guns crowned the bluffs above the town, where they could deliver a plunging fire, while themselves above the reach of guns on shipboard. It seemed impossible to reduce the place without the assistance of a sufficient land force, but the government in Washington was urgent and the enemy's batteries had to be passed. This was the first attempt; many similar dashes were subsequently made over the same spot, but no permanent results were obtained until General Grant appeared on the scene with his army in the following summer.

After a preliminary bombardment by the mortar flotilla, the fleet got under way at three o'clock on the morning of June 28. The vessels advanced in two columns, the *Richmond, Hartford* and *Brooklyn* in the order named, forming the starboard column, while the port column was composed of the *Iroquois, Oneida, Wissahickon, Sciota, Winona, Pinola, Kennebec* and *Katahdin.* As the flagship came within range of the enemy's works, her guns opened with "admirable coolness and deliberation," but she labored under the disadvantage of not knowing the location of the batteries on shore, which were only revealed by the flash or smoke of their guns. At one time the *Hartford,* which moved slowly, stopped opposite one of the lower batteries, the more effectually to silence it, and during this brief artillery duel she was much cut up in both hull and rigging.

By six o'clock the action was over, and all but three of the vessels were anchored

above the enemy's position. A few days later Captain Davis came down from Cairo, Illinois, with the western gunboat flotilla, and the two flag officers had the satisfaction of reporting that they had effected a junction. But their elation was of short duration. The Confederates sent down an ironclad ram, called the *Arkansas,* which they were building up the Yazoo River, and the Union vessels were so unprepared for this unexpected visitor, that in a few minutes the enemy passed out of range and found refuge under the Vicksburg batteries. Several attempts were made to destroy the *Arkansas,* but none were attended with success.

On July 19 the fleet went down the river. This move was made necessary by the falling of the waters and the increased sickliness of the climate. Forty per cent of the crews were on the sick list, and the cases were increasing in number and intensity. The *Hartford* anchored off New Orleans on July 28, and a fortnight later her colors were half-masted for her commander, who had fallen a victim to the climate. The command of the ship devolved upon Lieutenant Commander James S. Thornton (August 10, 1862), who kept her until relieved by Captain James S. Palmer at Pensacola, Florida, on August 27. Two and a half months were spent at the old naval station, and the change of climate soon got the "crew back to their accustomed tone," while the flagship was refitted and many of her battle scars removed. The Confederates, however, were not idle during this time, and before many weeks they began to show unusual activity on the Mississippi between Baton Rouge and Port Hudson. Feeling that his presence was necessary, Rear Admiral Farragut decided to return to the Crescent City in the first week in November.

The lack of supplies and the absence of an adequate land force prevented the admiral from making an immediate start up the river. "I am still doing nothing," he wrote from New Orleans on November 27, "but waiting for the tide of events and doing what I can to hold what I have." A change in the military commanders further complicated matters, and the reorganization of the army progressed so slowly that three months later the fleet was still waiting at its anchorage. On March 11, 1863, the *Hartford* moved up to Baton Rouge, and two days later the warships came in sight of Profit's Island, seven miles below the bend on which Port Hudson is situated. The object of the movement, as shown in the admiral's General Order to his captains, was to "run the batteries at the least possible damage to our ships, and thereby secure an efficient force above, for the purpose of rendering such assistance as may be required of us by the army at Vicksburg."

Only six ships could be spared to accompany the flagship: the *Monongahela, Mississippi, Richmond, Genesee, Albatross,* and *Kineo.* The larger vessels, except the *Mississippi,* were directed to take a gunboat on the port side, securing her well aft, so as to leave as much of the port battery as possible clear. Thus, if any one of the ships were disabled, her consort could tow her out of range of the enemy's guns. The vessels were prepared as at the passage of the lower forts, and in the *Hartford* the admiral placed his pilot in the mizzen-top, where he could see more clearly, with a voice tube for conveying his orders to the men at the wheel.

At 5:00 P.M. on March 14, the admiral received word from General Banks that his troops were "at the crossroads and all ready to move upon Port Hudson," and five hours later the squadron weighed anchor. At eleven the *Hartford* came under the fire of the principal batteries. The smoke from the guns soon enveloped the ship, and the pilot called out that he could not see ahead. The firing was immediately stopped—and not a moment too soon, for the fact was revealed that the flagship was running on shore right under the enemy's guns. Her stem actually touched the ground; but by her own efforts and the assistance of the *Albatross* she was backed clear. The *Hartford* then passed on without further incident, and, at 12:15, according to her log "cheered ship, having passed the batteries, with the loss of one killed and two slightly wounded."

None of the other vessels succeeded in running past the batteries, and the morning after the action the admiral found himself with his flagship and one light gunboat in the heart of the enemy's country. As previously arranged with General Banks, signal guns were fired at intervals during the morning; but no answering ones could be heard. The Union troops had driven in the Confederate pickets, but the defenses were found to be too strong, and the garrison too well prepared for them to attempt a serious attack.

Determined that the passage of the bat-

teries should not be altogether barren of results, the admiral headed the *Hartford* upstream. The following morning he anchored off the mouth of the Red River, and then he proceeded to Vicksburg where he was able to communicate with Rear Admiral Porter's squadron. On the way the *Hartford* and *Albatross* engaged a four-gun battery at Grand Gulf, Mississippi, losing two men killed and six wounded, but met with no other opposition. Admiral Porter was absent on an expedition in Deer Creek when the messenger from the flagship arrived, but communication was held with General Grant and the senior naval officer, who heeded the admiral's request for reënforcements to the extent of letting two wooden rams go down. Only one, the *Switzerland*, succeeded in the attempt and she was so roughly handled that a week's labor was required to put her again in fighting condition. As soon as the repairs were completed, the admiral stood down the river. At Grand Gulf the batteries again opened on the ships, striking the *Switzerland* twice and the *Hartford* once; the latter having one man killed. On the evening of April 1, the little squadron reached the Red River, where many skiffs and flatboats belonging to the enemy were destroyed. Five days later the flagship went down again to Port Hudson, as the admiral was anxious for news about the other ships and desired to communicate with General Banks. Ordinary methods of signaling having failed to attain these objects, the admiral's secretary volunteered to pass Port Hudson in a boat by night. A small dug-out was covered with twigs, arranged to resemble one of the floating trees not uncommon in the Mississippi. At nightfall Mr. Gabaudan stepped into his craft, and lying in the bottom of it, with a paddle and revolver by his side, was committed to the current. This bore him safely by, and at ten P.M. the vessels below signaled his safe arrival with rockets.

The next morning the *Hartford* returned to the Red River, where a Confederate steamer was captured. The presence of Union vessels interfered with the enemy's intercourse across the Mississippi, and was a serious menace to the garrisons at Vicksburg and Port Hudson. Notwithstanding the smallness of his force, the admiral was satisfied with his work, as is evident from the following extract from one of his private letters: "Whether my getting by Port Hudson was of consequence or not, if Pollard's stomach was as tightly pinched for food as theirs at Port Hudson and Vicksburg have been since I shut up the Red River, he would know how to value a good dinner and a little peace."

Meanwhile, General Grant had been maturing his plans for the campaign by which the Confederate strongholds were eventually reduced. Troop movements began in March, 1863, and in the following month seven ironclads of the upper squadron ran past the Vicksburg batteries and joined the *Hartford* and her consorts. During the next fortnight the flagship kept up the blockade of the Mississippi between Port Hudson and the Red River, twice intercepting stores crossing in flatboats, besides destroying a large quantity of Confederate commissary stores at Bayou Sara.

The military movements in western Louisiana being now supported by Rear-Admiral Porter's ironclads, the *Hartford* dropped down to Port Hudson, where Commodore Palmer was left in charge with the *Albatross, Estrella* and *Arizona* to maintain the blockade as long as the Confederates held out. Vicksburg surrendered on July 4, 1863, and five days later the garrison of Port Hudson also laid down its arms. The Mississippi was now open from Cairo to the gulf and on July 8 a merchant vessel left St. Louis for New Orleans, reaching the latter city on the sixteenth without molestation.

The Navy Department having directed that the command of the river as far as New Orleans should be assumed by Rear-Admiral Porter, Admiral Farragut was left in charge of the coast operations and blockade. Towards the end of July the two admirals met at New Orleans, and, the transfer having been made, Rear Admiral Farragut sailed for the north to enjoy a short respite from his labors. Needless to say, he took the *Hartford* with him, "as she has borne my flag during the whole cruise up to this moment. She is much cut to pieces, and I feel that the ship, as well as those who have so gallantly stood by her, have a right to this consideration, as I doubt if there ever floated a ship that has passed through more perils and come out so well."

On August 10, the admiral reported his arrival at New York, where the *Hartford* was sent to the navy yard for repairs. Upon examination it was found that she had been struck two hundred and forty times by shot

and shell during the nineteen months of active service she had just passed through.

Early in January, 1864, in the midst of a violent snow storm, the admiral again hoisted his flag on the *Hartford,* and proceeded to the gulf. After a passage of eighteen days, the flagship came to anchor off the Crescent City, but after a few days in the river she stood to sea again for the purpose of visiting the supply depots at Ship Island and Pensacola. Captain Percival Drayton came on board on February 9, 1864, and relieved Commodore Palmer in command of the *Hartford,* which now took up her station on the blockade off the entrance to Mobile Bay, Alabama. The admiral desired to attack at once the defenses of this port before the Confederates could complete the ironclads they were building; but the coöperation of an army force was necessary to reduce the forts, and the troops that might have been available had been diverted to Western Louisiana.

The city of Mobile is situated thirty miles from the gulf, at the head of a large bay of the same name. The principal entrance is from the sea direct, between Mobile Point, a long projection from the mainland, on the east, and Dauphin Island, on the west, the latter being one of the chain which bounds Mississippi Sound. The distance between these points is nearly three miles, although the presence of a long sand bank off Dauphin Island narrows the main ship channel to a little less than two thousand yards. This passage was guarded by two works, Fort Morgan and Fort Gaines, while the shallow approach from the westward through Grant's Pass was covered by Fort Powell, a small earthwork on Tower Island. The most important of the three was Fort Morgan. It was five sided, and built to mount guns both in barbettes and casemates. The armament consisted of eleven eleven-inch, six eight-inch, twenty-two thirty-two-pounder smoothbore guns, and eight 6.5-inch and 5.8-inch rifles. There were also twenty flanking twenty-four-pounder howitzers and two or three light rifles, but these were useless against the fleet from their position. In addition to the shore defenses, the Confederates had a small squadron under Admiral Franklin Buchanan, made up of the ironclad ram *Tennessee,* mounting six guns, and three small side-wheel gunboats, the *Morgan, Gaines* and *Selma.*

The first six months of 1864 wore away in the monotonous routine of the blockade, broken only by an attack upon Fort Powell, made from Mississippi Sound by several light-draft vessels. The gunboats could not get nearer than four thousand yards, but at that time, February 28, General Sherman was on his raid into Mississippi and the attack was believed to be of service as a diversion. The promised coöperation of the land forces, however, was still lacking and on June 14 the admiral wrote to Assistant Secretary Fox, "We are still lying here watching Buchanan. I can hear nothing from the army lately, which we consider a good sign; if there is bad news they send it immediately. If we had one ironclad we could go in any moment (but at present) that is useless because we could not get at their ironclads after we got in, and they could choose their distance on the flats to cut us up."

Towards the end of July General Canby's forces arrived "to stop the back door of each fort," while the wooden vessels lying before the harbor received the long-expected ironclad reënforcements. The *Manhattan* appeared on July 20 and the *Winnebago* ten days later, while the *Chickasaw* and *Tecumseh* joined the fleet on the eve of the battle. By this increase the fleet numbered twenty-eight vessels, and the admiral now carefully prepared his orders for entering the bay. As at Port Hudson, he determined to take in his fleet lashed in pairs, the heavier ships on the starboard, and the smaller vessels on the port side; the monitors forming a separate column inshore and abreast of the leading ships. The *Brooklyn* was given the honor of leading the line, followed by the *Hartford,* which was paired with the *Metacomet.*

At daylight the flagship made the signal to get under way, and at 6:30 A.M. the fleet was standing in across the bar. Shortly after seven Fort Morgan opened fire, which was answered at once by the *Brooklyn,* and immediately afterwards the action became general. "About 7:35 I heard a cry that a monitor was sinking, and looking on the starboard bow saw the turret of the *Tecumseh* just disappearing under the water," wrote Captain Drayton in his official report of the action. The *Brooklyn* suddenly stopped, and then began backing, coming down upon the next astern; at the same time her bow fell off toward the fort. The *Hartford's* engines were at once stopped, and as she held

her way and drifted on with the flood-tide, her bow approached dangerously near the *Brooklyn's* stern. While the vessels were thus close the admiral hailed to know what was the matter. "Torpedoes ahead," was the reply. "Damn the torpedoes!" cried Farragut from his post in the main rigging, "Four bells! Captain Drayton, go ahead! Jouett, full speed!" And the *Hartford* passed the *Brooklyn,* assumed the head of the line, and led the fleet to victory.

As the flagship moved across the line the torpedo cases were heard knocking against her hull, but fortunately the primers were corroded and none of the dangerous powder charges were exploded, and the vessel went safely through. "The rapidity of our fire, together with the smoke, so completely disordered the enemy's aim," wrote Captain Drayton, "that we passed the fort with no great injury or loss of life, a shell which came through the side and exploded a little abaft the mainmast, killing and wounding a large portion of number seven gun's crew, being the only one that caused much destruction."

Beyond the shore batteries, the *Hartford* came under the fire of the enemy's gunboats, which from their position were able to deliver a raking and galling fire, to which the flagship could only reply with her bow guns, one of which was soon disabled by a shell bursting under it. At no period of the action did she suffer as now. The quarters of her forward division resembled a slaughter-pen; the explosion of a single shell killing ten and wounding five men, while the splinters and mangled limbs were hurled aft. The greater part of the ship's company had never been in action, but so admirable was their spirit and discipline that no wavering was seen, nor was there any confusion even in reforming the decimated crews of the guns. "Nothing could be more noble than the spirit displayed by our wounded and dying, who cheered and smiled in their agony, seemingly contented at the sacrifice of their lives for the victory vouchsafed to their country. Such men are our heroes."

The *Metacomet* was cast off and ordered in chase of the Confederate gunboats, while the *Hartford* stood for the *Tennessee.* The latter tried to ram, but the flagship, having the greater speed, avoided the thrust without difficulty. Two shots were fired by the enemy at the same moment at such short range that it seemed wonderful they missed. The *Tennessee* then followed up the bay until the *Hartford* was about a mile from the rest of the fleet, when for some reason she gave up the pursuit and turned to meet the other wooden ships. The *Brooklyn, Richmond* and *Lackawanna* were attacked in succession, but the *Monongahela* thwarted the enemy's maneuver by suddenly turning and ramming the *Tennessee.* The blow was only a glancing one, and as the vessels swung around the ram fired a shell which entered the berth deck of the *Monongahela's* consort, the *Kennebec,* wounding five men. The *Ossipee* and *Oneida* also suffered from the fire of the enemy, but they were saved from serious injury by the timely intervention of one of the monitors.

The fleet now came to anchor about four miles up the bay, with anchors hove short, and the crews were sent to breakfast, as the movements of the *Tennessee* caused the admiral to think that the ram had retired under the guns of the fort. He was soon undeceived. At ten minutes before nine, when the men had hardly got seated at their breakfast, the ironclad was reported approaching. The mess gear was hustled aside, and the crews sent to their quarters. The *Hartford* at once got under way, as did the other vessels that had anchored, and signal was made to the monitors to use their guns as effectively as possible and to the *Monongahela, Lackawanna* and *Ossipee* to attack the enemy "not only with their guns, but bows on at full speed."

The *Monongahela* was under way at the time, and her commander immediately dashed for the ram. The latter was struck fairly amidships on the starboard side, but the blow caused the ram little injury, while the *Monongahela's* shot rolled harmlessly from her sloping sides. The *Lackawanna* followed, striking on the port side at the after end of the casemates, and causing the *Tennessee* to list over heavily. As the two vessels swung around, they fired their guns, but the Confederate admiral was intent upon closing with the *Hartford,* and after giving the *Lackawanna* two shots he headed directly for the Union flagship.

The two leaders now approached each other, head on, but just before the contact the *Tennessee* yawed a little, so that the bluff of the port bow in each ship took the blow. The *Hartford's* anchor, which was hanging from the hawse-pipe, acted as a

fender and was doubled up under the blow. The two vessels rasped by, the port sides touching. The nine-inch broadside guns drove their solid shot with their heaviest charge of powder against the *Tennessee's* armored sides; yet at a distance of ten feet they did the ram no harm. The primers of the latter, however, failed her, being heard by the flagship's people to snap unsuccessfully several times. One gun finally went off, its shell exploding on the *Hartford's* berth deck, where it caused several casualties. This was the last shot fired by the Confederate ironclad.

The *Lackawanna* now came up for another blow at the enemy, but in mid career she ran into the *Hartford* just forward of the mizzenmast, narrowly missing the person of the admiral, and cutting the flagship down to within two feet of the water. This onset of a friend was too much for the equanimity of Admiral Farragut. "Can you say 'for God's sake' by signal?" he inquired of the signal officer. "Yes, sir," was the reply. "Then say to the *Lackawanna,* 'For God's sake get out of the way and anchor!'"

Meanwhile the monitors had come up. The *Manhattan* and *Winnebago* opened fire on the *Tennessee's* port side, while the *Chickasaw* took up a position under the enemy's stern, from which she kept up an unremitting fire with her four eleven-inch guns. The port shutters of the ram were soon jammed, so that the guns could not be used. Then her smoke-stack came down, and the tiller chains were carried away. The *Tennessee* bore this terrible hammering, without being able to fire a gun in reply, for nearly an hour, when sore beset, and finding further resistance was hopeless, her commander displayed a white flag.

The fight had lasted little over an hour. The loss of the *Tennessee* was two killed and ten wounded, that of the Union fleet (from the forts and the enemy squadron), fifty-two killed and 170 wounded; the *Hartford's* proportion being twenty-five killed and twenty-eight wounded. It was a severe price that Admiral Farragut had been compelled to pay for this glorious victory—"the most desperate battle I ever fought since the days of the old *Essex,*" as he said to a friend.[3]

That afternoon one of the monitors attacked Fort Powell, which was abandoned by the Confederates under cover of darkness. Two days later Fort Gaines surrendered, but Fort Morgan held out for another fortnight. Mobile as a port for blockade-running was thus sealed by the fleet holding the bay; but the gigantic struggle going on in Virginia, Tennessee and Georgia delayed the final reduction of the city, as that would have necessitated the withdrawal from other more important theaters a large body of troops for a secondary object. In the meantime, the admiral was ordered north with the *Hartford,* reaching New York about the middle of December.[4]

After refitting, the *Hartford* was recommissioned, July 15, 1865, by Commander Robert W. Shufeldt for service on the Asiatic Station, where she remained for several years as the flagship of Rear Admiral Henry H. Bell. Commander Shufeldt was detached in September, 1866, being relieved by Lieutenant Commander Charles C. Carpenter, who was in turn succeeded by Commander George E. Belknap (February 19, 1867). In the summer of 1867, the *Hartford* sailed for the Island of Formosa in company with the *Wyoming,* to obtain redress for the murder of the crew of the American bark *Rover,* which had been wrecked on that island earlier in the year. One hundred and eighty-one officers and men were landed on June 13, under command of Commander Belknap, who drove the savages from their village and burned their huts. The expedition found the natives well armed and equal in courage to the North American Indians. Taking advantage of the high grass, they delivered their fire without being seen by the sailors, who often fell into ambuscades while charging the coverts. Realizing the futility of contending against the crafty savages with men unaccustomed to warfare of such a character, Commander Belknap wisely concluded to re-embark.

From August, 1868, to October, 1872, the *Hartford* was laid up in ordinary at the New York navy yard, after which she returned to the Far East flying the flag of the Rear

[3] The *Hartford* was struck by enemy shot twenty times. Her expenditure of ammunition was as follows: powder 187 charges nine-inch and twenty-seven charges 100-pdr. rifle; shell, 132 nine-inch, twenty-one 100-pdr. rifle, and thirteen twelve-pdr. howitzers; shrapnel, nine nine-inch; solid shot, thirty-three nine inch and six 100-pdr. rifle, chilled ends.

[4] She was placed out of commission at the New York navy-yard on December 20.

Admiral Jenkins. This cruise lasted three years, her commanding officers during the period being Captain Edward Y. McCauley (October 26, 1872), Captain Edmund R. Calhoun (August 14, 1873), Captain James C. P. DeKrafft (June 1, 1874), and Commander David B. Harmony (March 1, 1875). On her return to the Atlantic seaboard the *Hartford* immediately refitted for service in the West Indies, under Captain Stephen B. Luce (November 18, 1875), where she cruised for the protection of American interests. Later she was transferred to the South Atlantic Station, which was her cruising ground for two years, under Captain Henry A. Adams (August 21, 1877), Captain William K. Mayo (June 25, 1878), and Captain James A. Greer (May 19, 1879). On her return north, she was placed out of commission at Boston, Massachusetts, December 4, 1879.

A new commission dates from June 26, 1882, with Captain Charles C. Carpenter in command. Her orders took her to the Pacific station, where the old ship remained for nearly seventeen years, the latter part of the time at the Mare Island navy yard, California, where she was entirely rebuilt in 1898 at a cost of $600,000 and fitted as a training ship for landsmen. She returned to the Atlantic coast in 1899, under Commander John M. Hawley (October 2, 1899), and for the next eleven years she was identified with the practice cruises of the Naval Academy. She was placed in reserve at Annapolis, Maryland, on August 28, 1909, and in the fall of 1912 she was assigned as station ship at the Charleston navy yard, where she now remains.

The Grade *of* Admiral *in the* U. S. Navy

By LOUIS H. BOLANDER

THE word admiral is derived from the Arabic *Amir al* ("lord" or "chief of the"); *Amir al-bahr,* commander of the sea. The term seems to have been introduced into Europe during the Crusades, and to have been first used in a definite sense by the Sicilians, and later by the Genoese. In French, the word is preserved without change, as *Amiral;* in Spanish and in Portuguese, it has developed into *Almirante,* and in Italian into *Ammiraglio.* The old English form was very likely similar to the French, as we find it spelled *Amyrell* and *Admyrall.* It was Latinized into English as *Admiralius,* and as early as the reign of Edward III was anglicized as *Admyrall.* The first English "admiral of the seas" was William de Leybourne, 1297. His office was not, however, that of a commander of sea forces, but embraced general and extensive powers afterwards associated with the title of Lord High Admiral of England.

In the U. S. Navy, John Paul Jones seems to have been the first man to consider the title as a designation for our higher naval commissions. Only two months after the Declaration of Independence, he wrote to Robert Morris of the Marine Committee:

> I am convinced that the parity in rank between sea and land or marine officers is of more consequence to the harmony of the service than has generally been imagined. In the British establishment, an admiral ranks with a general, a vice admiral with a lieutenant general, a rear admiral with a major general. . . . . I propose not our enemies as example for general imitation, yet as their navy is the best regulated in the world, we must in some degree imitate them, and aim at such further improvement as will one day vie with and exceed theirs. Were that regulation to take place in our navy, it would prevent numberless disputes and duellings that otherwise would be unavoidable.

Morris seems to have considered his suggestions favorably for on November 15, 1776, Congress fixed the relative rank of Army and Navy officers as follows:

Admiral with general.

Vice-admiral with lieutenant general.

Rear admiral with major general.

Commodore with brigadier general.

Captain of a ship of forty guns and upwards with colonel.

Captain of a ship of twenty to forty guns with lieutenant colonel.

Captain of a ship of ten to twenty guns with major.

Lieutenant of the Navy with captain.

The four higher grades were not established at this time and for nearly a century the highest rank in our Navy was that of captain. The adoption of the grade was urged repeatedly by different heads of the Navy Department, and warmly seconded by the President in office but nothing came of their proposals.

On November 15, 1814, the Secretary of the Navy recommended:

> It is now expedient to establish the grade of rear admiral . . . . leaving the promotions to vice admiral and admiral to future services, and an enlarged establishment.

The Naval Affairs Committee reported to the Senate on November 28, and emphasized the "cheerless prospect" before the naval officer in respect to promotion, and stressed the importance of the enlargement of the "range of promotion."

In 1820, President Monroe emphasized the need of grades above that of captain in the naval service. He was confident that they would "essentially contribute, if not be absolutely necessary to due subordination and discipline in the service." He again transmitted to Congress (December 2, 1822) a report from Secretary Thompson that provided for two grades in the service above that of captain—to be known as "commodore" and "rear admiral." A year later he transmitted a plan worked out by Secretary Samuel L. Southard for re-organizing the naval establishment, urging the creation of the grades of vice-admiral, rear admiral, and commodore.

In his annual report (1830), John Branch, Secretary of the Navy, wrote:

> When the U. S. marine was confined to a few frigates and smaller vessels no advantage could have been gained in any point of view for higher grades in the naval service than that of captain. But since the great increase in the number and size of United States vessels of war and as occasions arise for their combination into fleets or squadrons, other duties, arduous and responsible, and requiring the possession of superior nautical knowledge and general intelligence devolve upon their commanders. These higher degrees of qualification merit a correspondent elevation in rank and distinction. It has been supposed also, that superior rank has a tendency to secure the enforcement of discipline, inasmuch as the orders of a superior are more readily and faithfully observed than one of equal grade. The increase may certainly obviate some causes of irritation in the intercourse of the officers of the Navy with foreign powers, the least powerful of which have higher grades than are known in this service, and universally claim honors and precedence according to their rank. This must either be yielded or intercourse suspended; and this could not but result injuriously, should it be necessary for the United States vessels to coöperate with those of other nations in any difficult naval enterprise.

On December 27, 1832, Secretary Woodbury advised the establishment of flag rank. He would make the annual pay of an admiral $5,000; of a vice admiral $4,500; and of a rear admiral $4,000.

The next year President Jackson submitted a report on "The rules and regulations for the government of the Navy of the United States" prepared by the board of revision headed by Captain John Rodgers. This board was created by an Act of Congress approved May 19, 1832. Chapter 1, Article I read as follows: "Sea officers of the Navy of the United States shall take rank in the following order: admirals, vice admirals, rear admirals, captains, commanders (heretofore called masters commandant), lieutenants."

Secretary Upshur, in his annual report for 1841, stated:

> The rank of admiral is known in all the navies of the world except our own, it has existed through a long course of past ages, and has been fully tested in the experience of all nations. *It still exists and is still approved.* . . . . Our naval officers are often subjected to serious difficulties and embarrassments in the interchange of civilities with those of other countries on foreign stations. The admiral of England, France, or Russia, is not willing to admit he is of no higher grade than the post-captain of the United States.

Eight years later Secretary Graham proposed to add rear admirals to the naval service.

These repeated attempts to establish higher grades in the naval service aroused considerable comment in the press of the day, particularly in periodicals devoted to the interests of the Army and Navy. These service periodicals were whole-heartedly in favor of such grades, but many newspapers were outspoken in their denunciation of the idea. An anonymous writer in the *Military and Naval Magazine* of January, 1834, says:

> The experience of all ages goes to prove that equality of rank is incompatible with discipline in any military establishment. Every combined force must have a chief as well in rank as in command. The title is of little consequence, but I see no objection to adopting the titles of the navies of Europe into our Navy.

A naval officer in the *Army and Naval Chronicle* says:

> In foreign ports we meet men, superior in rank to our highest grades, commanding forces inferior to our own; and our officers behold men in other navies more highly rewarded for less services. These men of higher rank in case of collision would necessarily take precedence, and in the event of coöperation would take command, and thus gather the laurels that our exertions might have reaped.

Two weeks later in the same periodical an enraged citizen answered him hotly, and after several stinging remarks states that "the public interest no more requires the new grade of admiral to be added to the Navy than it does the bestowing of orders of nobility on all the diplomatic agents that represent the United States at the different courts of Europe."

The *Democratic Review* of April, 1851, ridicules the idea of higher grades. The title savored too much of royalty. Their reasoning seems ridiculous to us at this time, though probably this journal and others like it had many warm adherents.

Not until the Civil War made the matter imperative did Congress make any definite effort to establish higher rank. On July 16, 1862, an act was passed providing for nine grades of commissioned officers in the Navy, the highest of which was rear admiral, to which not more than nine officers could be appointed. On the same day Captain David Glasgow Farragut was appointed the first rear admiral in the United States Navy. Two years later, Congress empowered the President to appoint one vice admiral from the list of acting rear admirals. His rank should be equivalent to that of lieutenant general. In recognition of his distinguished services at New Orleans and at Mobile Bay,

Rear Admiral Farragut was made vice admiral. A year after the Civil War, Congress created the grade of admiral, and provided that the number allowed in each grade of line officers above the rank of captain on the active list of the Navy, should be one admiral, one vice admiral, and ten rear admirals. The day after the act was approved Farragut was made admiral, giving him the distinction of being the first rear admiral, the first vice admiral, and the first admiral in the United States Navy. The grade of vice admiral vacated by Farragut was given to Rear Admiral David Dixon Porter. On the death of Admiral Farragut in 1870, Porter became admiral and Rear Admiral Rowan became vice admiral.

Three years later, Congress provided that the grades of admiral and vice admiral should not be filled by promotion, and that, upon the deaths of Porter and Rowan, these grades should cease to exist.

On August 5, 1882, Congress reduced the number of rear admirals on the active list to six, but on March 3, 1899, the Navy Personnel Act provided for eighteen rear admirals who were divided for pay purposes into two grades, the nine lower numbers being given the pay and allowances of brigadier generals, and the upper nine numbers received the same pay and allowances as officers of corresponding rank in the Army, that is, of major general. This act continued in force until May 13, 1908, when Congress provided different rates of pay for "rear admirals, first nine," and "rear admirals, second nine."

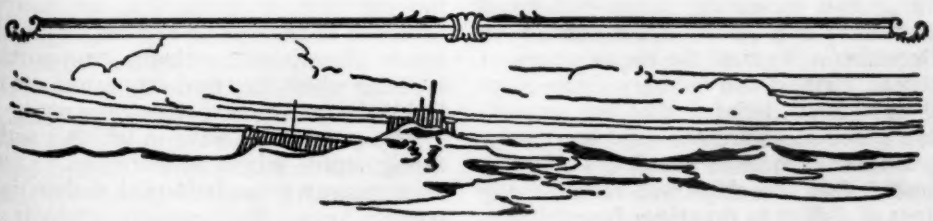
By the act of August 20, 1916, provision was made for increasing the number of officers allowed in the different grades and ranks of the Navy, and that, hereafter:

> pay and allowances of officers in the upper half of the grade or rank of rear admiral, including the staff corps and including staff officers, heretofore permanently commissioned with the rank of rear admiral shall be that now allowed by law for the first nine rear admirals, and the pay and allowance of officers in the lower half of the grade or rank of rear admiral, including the staff corps, shall be that now allowed by law for the second nine rear admirals.

On March 2, 1899, the President was authorized to appoint an "Admiral of the Navy," but with the provision that when the grade became vacant by death, the title should cease to exist. The Navy Personnel Act passed the following day made no mention of this grade, so the authorization for this grade was reënacted in the same words as a clause of the Naval Appropriation Act of March 3, 1899. The grade was immediately conferred on Dewey, who held it until his death on January 16, 1917.

The Naval Appropriation Act of March 3, 1915, provided that the commanders-in-chief of the Atlantic, Pacific and Asiatic fleets should be invested with the rank of admiral while on such duty, and that the officers second in command should have the rank of vice admiral, but only while on such duty. This act was repealed two years later (May 22, 1917), and the President was authorized to select six naval officers for the command of fleets, not more than three of whom should have the rank and pay of admiral while on such duty, and the remaining three to have the rank and pay of vice admiral.

By the act of August 29, 1916, it was provided that the Chief of Naval Operations should have the rank and pay of admiral while so serving, such officer to take rank immediately after the admiral of the Navy.



Merchant Marine : National Necessity

By LIEUTENANT ALBERT F. CERES, JR., *U.S.N.R.*

AMERICAN business men, farmers, miners and others interested in foreign markets, for the first time since the war, have acknowledged the imperative necessity of an American ocean-going merchant fleet, according to the consensus obtained by Shipping Board commissioners who recently concluded a series of thirty-one hearings on the merchant marine problem throughout the nation. Not since the abnormal war period had there been, until the middle of last summer, a more positive indication of this country's dependence upon foreign shipowners for the transportation of American manufactures and commodities, than was manifest simultaneously with the withdrawal of considerable foreign merchant tonnage from American trade during the British coal miners' strike. It happened coincidentally that the Shipping Board commissioners were holding hearings in the various industrial and agrarian districts at a time when the normal ocean situation was disturbed. No better time could have been deliberately chosen.

Eliminating discussions and allegations of the Shipping Board's critics, who allege political motives for the government's action in supplying the necessary tonnage to move American products, the fact remains indisputable that without the reserve of ships, our heritage of the war, American exporters, especially those in the southern and western districts, would have met a virtually ruinous economic situation through their inability to expeditiously move their commodities.

Ninety-two steamships were withdrawn from reserve and placed in commission up to December 1, to meet the requirements of American farmers and industry. Some shipping men have declared that the government's action in placing the ships in commission averted a panic in the South. It was estimated that the ships will return many millions of dollars to American farmers, who otherwise would have been unable to reach foreign markets, because of the non-availability of merchant tonnage.

While the situation caused by the British coal miners' strike is a current example of how America is affected through the withdrawal of shipping by foreign nations and how ocean transportation rates soar, affecting virtually every American industry to some degree, the condition would be of greater magnitude, importance and widespread effect should the British empire suddenly find itself involved in or confronted with a major war. The effect on American foreign trade and the normal condition of domestic markets would be tremendous.

Admitting the importance of the Shipping Board's fleet as a factor in American foreign trade at present, with its stabilizing effect on ocean rates, a situation, such as would ensue should Great Britain withdraw her fastest liners and hundreds of cargo carriers from America's trade, would be too difficult for the present merchant marine to guarantee and maintain the ocean communications necessary for the normal continuance of American trade and uninterrupted passenger travel.

National defense in our country no longer exclusively means protection against warlike actions of other nations. It now includes defense against the assessment of ocean freight rates by foreign ship owners, which would preclude American merchants' profitable participation in the world's trade. Regardless of what it actually costs to maintain the government fleet at sea to carry part of our trade with the world, the expenditure should not be looked upon as a total loss, but on the contrary, as protection, an insurance premium to assure our markets; to guarantee to American merchants transportation facilities which they probably would not have had if the government ships were not used.

There are many ways in which a nation's foreign trade might be destroyed. Competition among great industrial nations is extremely keen. Each country attempts, and in most instances successfully does protect its commercial interests in various ways. The most effective protection a nation can give

its foreign trade is through financial aid to merchant shipping. Every important nation, with the exception of the United States, aids its shipping through some expediency, either in the course of construction or while it actually is operating in competitive trade, or in establishing new trade routes thus opening new fields for its merchants.

The only protection United States ships have is in the coastal trade. Long ago, our forefathers had vision enough to discern that sometime the United States would be large enough to support a vast fleet of carriers, that could in emergency form the nucleus of a naval auxiliary. And in contrast with this, our foreign trading ships were neglected and are now competing, without protection in the most competitive of commercial pursuits. They sail on virtually profitless voyages, and in some instances at a loss, whereas most foreign ships are subsidized by their respective governments and can show profits.

This particular and rather unfortunate circumstance of American shipping engaged in foreign trade becomes more complex when it is remembered that the United States has the greatest and strongest protective tariff of any nation. Our country now is demanding a merchant marine. This merchant marine, in the opinion of the vast majority should be privately owned. But to do this financial aid must be given by the government, either directly or indirectly, if we are to accomplish the desired result in the immediate future. Meanwhile, until it can be transferred to private ownership, the government should own and operate the ships to insure the permanency of a merchant marine.

The necessity for an American owned and operated merchant marine is easily discernible. Every effort must be made to build up the fleet. Our early history shows how important our small merchant fleet was to the building of the nation. Our clipper ships of half a century ago showed their sterns to every nation's ships. They carried cargo everywhere—and cargo of every nation—frequently at higher rates than foreign vessels obtained for the same voyage with a similar freight. The situation now is reversed. We are handicapped with antiquated laws governing merchant shipping.

Throughout the pages of history there are indications that nations rose and fell in virtually the same ratio to which they maintained naval supremacy and their merchant fleets. If the United States is to remain in its present position as a great power, we must have our own merchant ships, all types, sizes and numbers equal to those of our commercial competitors and offer service comparable if not better than the best offered by any foreign nation. We are far behind in all competitive respects as compared with other maritime powers.

More than half of America's merchant fleet, including ships on the Great Lakes and in the coastal trades, are obsolete and uneconomical as compared with foreign ships. Most of the ships are war built craft, designed to carry great deadweight at low speed. Foreign ships in many instances are more economical than ours. Their speed is greater and consequently they obtain the higher classes of freight and passengers. We need many replacements and additions to our fleet to give it a semblance of balance to meet the requirements of shippers and travelers.

Motorships are continually entering the world's trade routes. Their economy has been demonstrated. America has few. The Shipping Board, however, has designated fourteen ships for conversion from steam to Diesel propulsion, thanks to the foresight of Rear Admiral William S. Benson, and his ability and keen appreciation of the importance of merchant shipping to the nation's welfare. The first motorship of the group already has carried a full cargo of cotton to Bremen. It is ready to meet foreign competition on the long voyage trades. But we must have numerous additional units.

The superiority of the motorship in comparison with the steam propelled vessel of the same size is proved, through; less fuel consumed per day, larger cargo carrying capacity, continuously sustained speed, longer operating radius, elimination of stand-by losses, larger saving in fuel by use of electric auxiliaries, saving in upkeep costs, fewer men in the motor room, more contented personnel due to the absence of dirt and discomfort, lastly, but not the least in competitive trades, the motorship's other advantage is in the cheaper insurance rates allowed the underwriters. Great Britain, Italy, Japan and the Scandinavian countries are putting the economical motorship on the long voyages and in the most highly competitive trade routes. Eventually, if the United

States does not take its rightful part in these transformations, commensurate with our importance in international commerce and world affairs, we will attempt to enter when it is probably too late.

An example of competition in ocean shipping in the round-the-world service, may well be given as related to an American enterprise. The company operates a fleet of combined passenger and cargo carriers, steaming at about 15.5 knots. Little competition at first was offered to its complete service, although it continually, since its establishment, was forced to compete for the port to port traffic, in the short runs.

A big, efficient and financially successful British shipping firm entered virtually the same route, but with motorships capable of maintaining an average speed of 16.5 knots or better. Consequently they are carrying tremendous quantities of express freight from the Atlantic coast territory to the Orient and Far East. From the Orient, Far East, Philippines, Dutch East Indies, Straits Settlements ports and elsewhere in that area, they are obtaining higher valued cargoes than the American company. Among other commodities, they carry great shipments of rubber for our industries. We pay the freight and the money goes to fill foreign coffers. In addition to this competition, which is fair in every respect, another line of British owned motorships has entered the route. Both these fleets make better time to and from the Atlantic coast than the American ships.

Too much emphasis cannot be placed on the importance of the large fast ships. In these the United States stands in the ratio of one to six. These are easily and quickly convertible into naval auxiliaries, and even in their peaceful commercial pursuits might be called cruisers. With the tendency to reduce the size of purely naval vessels these ships will become more important than ever. The story of the *Carmania* is too recent to have been forgotten. Transformation from a liner to an armed cruiser in a week is remarkable example of speed and preparedness.

We must have our merchant marine because on many of the American trade routes, foreign ships were withdrawn when the opportunity for greater profits in the coal carrying trades became apparent. To withdraw ships from a route and place them in another offering greater profits, from the shipowner's viewpoint, is logical. However, the withdrawal of the ships necessarily affected someone, and in this case, the effect was not wholly upon the American merchant alone, but, in addition, also his foreign customer, while it probably simultaneously offered a market to a competitor. One of the outstanding effects of the British coal strike in addition to the gulf situation has been the inability of shippers in two North Atlantic ports to move their cargo to Glasgow, because of the withdrawal of foreign tonnage.

To offset the withdrawal of foreign ships the Shipping Board, up to December 1, had to place ninety-two ships, with capacities varying from 6,000 to 9,000 tons, on the trade routes abandoned by foreign shipowners. The plight of American exporters was precarious. Their first thought was to seek the assistance of the government. What the situation would have been without the reserve of ships is not problematical.

Tramp steamship services to this country are almost as important as the fast freight and passenger liner service. They are extremely essential to the entire country. It is these vessels, seeking cargoes of all natures, willing to carry them anywhere at low rates, that enable American importers to bring raw materials to their receiving points and likewise offer exporters transportation to move large volumes of bulk cargoes to other parts of the world at reasonable rates. Normally American ships, because of their high initial costs and greater operating expense, are unable to compete for this traffic. The vessels placed in service by the government during the recent abnormal condition, were used in some instances in purely tramp services, such as carrying full cargoes of cotton and grain, while others filled in on scheduled routes where the demand for space could not be met by the normal allotted tonnage.

The port of Philadelphia now is deprived of a service to the small Brazilian ports, inaccessible to the large freight ships. The foreign vessels, which had established the route several months ago under the management of American shipping men, and which were making a profit, were withdrawn and placed in the coal trade. There are numerous instances of this kind at present affecting American industry, that would not have applied, if the American merchant marine

could in some way be placed on a competitive equality with foreign ships.

The necessity for an American merchant marine is so apparent and obvious that it frequently seems unnecessary to again mention the reasons why it should be established on a permanent basis. A real merchant marine is not a "thing," it is a "service," and the United States because of its continually increasing production must give service to its merchants to uninterruptedly meet competition and the foreign demand for our products.

Benefits, too numerous to mention, accrue to the nation possessing an efficient merchant marine. The most outstanding beneficial influences have resulted since the establishment shortly after the war of the express passenger and freight service to ports on the east coast of South America. The service now is maintained every two weeks by the Munson Steamship Company to Rio de Janeiro, Santos, Montevideo and Buenos Aires. Prior to the establishment of the line, excellent ships were operated from South American ports to Europe, instead of to the United States. Naturally they were! Every nation, except the United States, has continually appreciated the axiom that "trade follows the flag." Certainly, with the better steamship communications, most of the South American business was conducted with European nations offering the services. The services rendered by a large British steamship company and the Lloyd Brazileiro to the United States were not comparable to those offered travelers by lines operating to Europe. The sailings were infrequent, ships slow and the accommodations were not the most desirable as compared with the vessels to Europe.

A fleet of 535-foot "state" ships, originally built as transports, was placed in the South American route—swift liners, with passenger accommodations and appointments, comparable to trans-Atlantic liners. Consequently hundreds of South American merchants who probably never would have come to our shores, are regularly making the quick journey to the United States in these fine ships. Statistics of our trade relations with Brazil, Uruguay and the Argentine, are impressive now as compared with the business transacted before the establishment of the service. Think of making a voyage to Rio from New York in less than twelve days, as compared with sixteen days, and to Buenos Aires in less than seventeen days as compared with the previous twenty-four-day voyage.

The establishment of the fast services to the east coast of South America has accomplished more, according to bankers, to decrease long time credits than any other factor. A progressive bank in one of the North Atlantic ports recently completed a survey showing that in 1900 only from three to five per cent of the total production of the district was exported, while the same area now exports from 15 to 33½ per cent of its various lines of manufactures. The same increase in export commerce applies to virtually every other industrial section in the country. Isn't this sufficient reason why we should have our own merchant ships? A tremendous volume of American exports is shipped to South American countries and the stimulus the trade has received can be attributed in no small measure to the establishment and maintenance of fast passenger and freight services to the Latin American countries.

The foregoing indicates a situation in international shipping that should cause an awakening of the American people to the necessity of owning and controlling the movements of a fleet of cargo and passenger ships; the necessity of immediately revising our laws affecting merchant shipping, by modernizing them to meet existing and future conditions and the necessity of concerted action on the part of all interests. Especially apparent is the urgent need for the coöperation of all members of Congress, regardless of their party affiliations, to enact immediately, enabling legislation for the up-building of the American merchant marine to a point of competitive equality, commensurate with America's position in international commerce and world affairs, both from the economic viewpoint and also as a measure of actually needed national defense.

The Line *of* Position

A Short Accurate Method Using Ogura's Altitude Tables and Rust's Modified Azimuth Diagram

By Lieutenant Commander P. V. H. Weems, *U. S. Navy*

THIS article is written in an effort to simplify the working of the line of position. No claim is made of invention of either the method of computing the altitude or of finding the azimuth; in fact, both have been in use for several years, though not in combination. The idea is based on the fact that the solution of the spherical triangle by Napier's Rules may be reduced to the form, $x=ab$, where x is the computed altitude, and where a and b are terms which may be tabulated in logarithmic form. The term b includes one combination of two angles, and this combination together with the addition of two logarithms gives the log cosecant of the altitude.

The computed altitude thus found gives us a point on the line of position, but the complete problem requires also the determination of the direction of the line which is at right angles to the azimuth. In order to utilize this simple method of computing the altitude, we must use an independent method of finding the azimuth, When there is no question as to the accuracy of the compass, the azimuth and altitude may be observed at the same time, then it remains to compute the altitude alone.

We shall now go more into detail to show how the computed altitude may be found quickly and accurately. Each step is included here for reference and to make the description complete. A knowledge of the mathematics involved, while simple, is not necessary for the correct solution of a sight.

Abbreviations used:

H.A. (or t)	Hour angle	Z	Azimuth from N or S to the E or W
L	Latitude	Z_n	Azimuth from 0° to 360°
d	Declination	H_c	Computed altitude
		H_o	True altitude

First, we shall write down Napier's Rules, and show by Fig. 1 the co-parts of the right spherical triangle, the right angle being disregarded as a part of the triangle.

Rule I. The sine of the middle part is equal to the product of the tangents of the adjacent parts.

Rule II. The sine of the middle part is equal to the product of the cosines of the opposite parts.

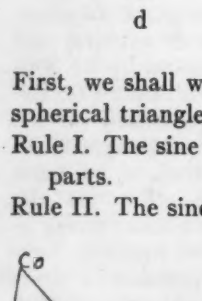


FIG. 1

Let Fig. 2 represent the spherical triangle used in navigation when it is projected on the plane of the horizon. In triangle PZO we have by Napier's Rule I,

(1) $\cos t = \cot K \tan L$, or $\tan K = \tan L \sec t$.

By Napier's Rule II, we have,

(2) $\sin L = \sin K \cos N$, or $\cos N = \sin L \operatorname{cosec} K$.

From these two equations we compute the values of K and N. Having K, we combine it with d algebraically to get the side MO or $K \sim d$.

Now with the sides $K\sim d$ and N in the triangle MOZ we find H by Napier's Rule II,

(3) $\sin H = \cos N \cos(K\sim d)$, and inverting this we get,

(4) $\operatorname{cosec} H = \sec N \sec (K\sim d)$.

Equation (4) is an exceptionally strong formula mathematically, and the one used with this method. The parts N and K are auxiliary values introduced to facilitate the solution. As shown in Fig. 2, N is the perpendicular from Z on the meridian PM, while K is the distance on the same meridian from the foot of the perpendicular to the equinoctial. K and d combined algebraically give the side OM of the triangle MOZ. The side MZ is found by using the sides MO and OZ as arguments; or, by calling the sides by their names, H_c is found by using $K\sim d$ and N as arguments.

We might add here that K is the same quantity as the "b" in Commander Aquino's tables. By thus combining K and d as angular values, the use of natural functions is avoided, and log cosec H_c is found by the addition of two logarithms.

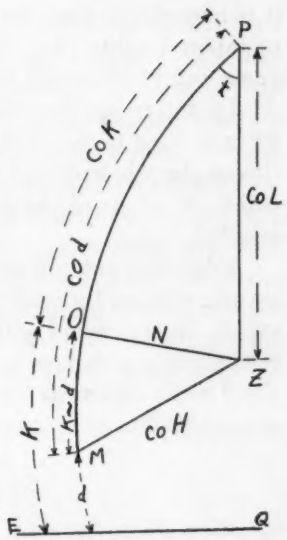


FIG. 2.

Referring again to Fig. 2, for any given values of t and L in the triangle PZO, there are definite values of N and K. Also, for any given values of K$\sim$d and N in triangle MOZ, there is a definite value for H_c. Therefore, if we prepare a table with t and L as arguments, giving K (in arc) and log sec N, we may find K and log sec N by inspection. Likewise, by entering a log secant table with the arc K$\sim$d as the argument, we get by inspection log sec (K$\sim$d). Since by equation (4), log cosec H = log sec N + log sec (K$\sim$d), the sum of the two logs found is log cosec H_c. Also, since log sec and log cosec may be included in one table by entering at the top and left margin for log sec, and at the bottom and right margin for log cosec, one table will suffice for both log sec (K$\sim$d) and log cosec H_c.

Tables such as those just described have been arranged by Hydrographic Engineer S. Ogura, I. J. N., and he has given us his permission to publish them in the United States. These tables are in two parts, Table A and Table B, and comprise altogether 27 pages. Equation (3) is inverted and left in the form, cosec H_c = sec N sec (K$\sim$d), in order to simplify the tables. For example, the value of cosine being less than one, its log will be in the form, log cos 10° = 9.99335 − 10, whereas the secant being greater than one, its log will be in the form, log sec 10° = 10.00665 − 10. Therefore, log secants are used, and every log multiplied by 100,000 in order to rid the tables of all indices and unnecessary zeros, the log sec 10° being written 665. Where six place logs are necessary for accuracy they are used and are shown by placing a decimal after the fifth place log; for example, 665.3 would be a six place log.

The compactness, uniformity and brevity of the tables, and their freedom from complicated nomenclature, together with the fact that there is only one standard method of solution for all sights, give additional advantages which are not apparent by a casual inspection of the tables, since these facts lead to increased speed and accuracy.

Table A is arranged with all integral values of hour angle (in degrees) as the leading argument, that is, a separate column is provided for each whole degree of hour angle. The other argument is the latitude, also integral degrees, and this is given for each degree of latitude from 0° to 65°.

Table B is simply a log sec table, giving log sec (K$\sim$d) for each minute of arc. Now

it is improbable that for a given D.R. position the values of hour angle and latitude will be integral values, but for some position near the D.R. position, the values of both hour angle and latitude will be integral values. (See Fig. 3.)

To determine the longitude to be used, find one nearest the D.R. longitude such that when applied to the G.H.A., it will make the L.H.A. an integral degree. For the latitude, choose the whole degree nearest the D.R. latitude. Since the assumed position is always within 30′ of arc of the position in both latitude and longitude, long altitude intercepts are avoided.

Table A is entered at the top with an integral value of H.A. in degrees, and at the left margin with an integral value of L in degrees, and the tabulated values of A(=log sec N) and K (in arc) found without interpolation. K always takes the sign of L and is combined algebraically with d to get K∼d, i.e., sum when the signs are unlike, and difference when alike. K∼d is the argument for entering Table B. Enter with the degrees at the top, and with the nearest minute at left margin, and take out B. The sum of A and B is log cosec H_c, therefore,

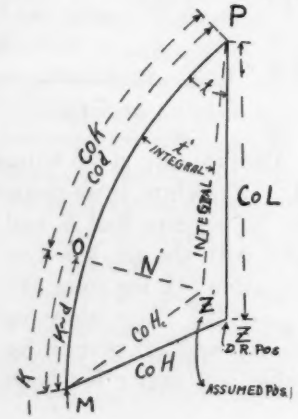


FIG. 3

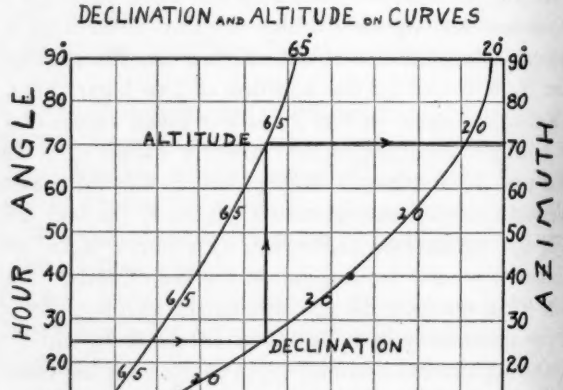


Fig. 4

we enter Table B with A+B and find the degrees of altitude at the bottom and the minutes of altitude at the right margin.

These tables appear as a part of the *New Altitude and Azimuth Tables* published by the Hydrographic Department, Tokyo, and are also included in Norie's Tables. The former book states: "The calculations in tables B and H_c are to be made to a minute of arc, and need no interpolation. The altitude thus obtained should be correct to within 1′. If a more accurate value is required, we have to make interpolations in tables B and H_c; but, for practical purposes we scarcely need such interpolations." The accuracy of the tables has been further determined by Asst. Professor Wm. A. Conrad, Department of Mathematics, U. S. Naval Academy. The results of his investigations will probably be given in an early issue of the PROCEEDINGS. While we are not at liberty to give these results in detail, we may say that the tables were found to have an accuracy entirely sufficient for practical navigation. We speak of the accuracy of the tables as distinguished from the accuracy of solution. The accuracy of solution does not necessarily mean accuracy of position since the latter depends also on the accuracy of the data used.

Having described the method of computing H_c, we will now take up the question of finding the azimuth. Weir's Diagram, or any other method with which the navigator is

familiar, may be used. We recommend the use of Rust's *Modified Azimuth Diagram* (R.M.A.D.), which we think is best, considering the factors of speed, accuracy, and simplicity. This diagram has the advantage over Weir's Diagram in that it does not require the use of parallel rulers. Also, its use is simple, only one set of uniform curves being used for the diagram. Furthermore, it may be divided into vertical sections for convenient binding into a book. The speed with which the azimuth may be found is one of its greatest advantages. The accuracy of the diagram has been determined by the solution of fifty problems taken at random from text books and Naval Academy examinations, the results being compared with solutions by the azimuth tables. The average error was .11 degree; the maximum error was .2 degree. The average time was 55 seconds for each azimuth and this is probably at least double the time required in practice. Captain Rust has given us his permission to modify and use his diagram which appears in his *Practical Tables for Navigators and Aviators* published in 1918.

RUST'S MODIFIED AZIMUTH DIAGRAM

(Formula used: $\sin t \cos d = \sin Z \cos H$)

The values of t are shown in left margin, of Z, in right margin. Both H and d are plotted on same curves and numbered alike. Fig. 4. illustrates its use. Given: $t = 25°$, $d = 20°$, $H = 65°$, body bearing north and east, we find $Z = N70°.5E$, and $Zn = 70°.5$.

On the diagram the interpolations are made by sight, while in the tables this is done mathematically. The principle that accurate interpolations may be made quickly and easily on curves is utilized in checking compass when we construct curves of azimuth and Napier's Diagram. In fact, it is a great deal easier to interpolate on the diagram by sight than to do so in tables.

Since both the tables and the diagram are based on the same conditions, viz., the apparent motion of the body across the sky, they both have the same weakness when the body crosses the meridian near the prime vertical. Captain Rust states that the azimuth may be found by the diagram to one fourth of a degree. This certainly is close enough for the practical navigator when it is admitted that bearings and courses by the compass cannot be observed closer than a quarter of a degree, nor the courses and lines of position laid down closer than the same amount.

One advantage of finding the azimuth independently by the diagram is that by taking the t and L for the D.R. position instead of for the assumed position, the true azimuth for checking the compass is obtained, though there would be only a few tenths of a degree between the results obtained by using the D.R. and by using the assumed position.

For any desired accuracy of azimuth, it is only necessary to increase the scale of the diagram enough to accomplish the desired end. The scale of the azimuth diagram given in Rust's *Practical Tables* has been multiplied by 1.5 in the diagram. The complete diagram to full scale would necessitate the use of a folder to include it in a book, therefore, in order to include it in a book to the proper scale and in convenient form, it has been divided into two parts. In this way separate double pages show the left and right parts.

The simplicity and neatness of the system will now be shown by working a typical sight of the sun and of a star. First we shall enumerate the steps in the solution for all cases, only one uniform method being used.

METHOD OF SOLUTION

For the Altitude Difference.

(1) Find the Greenwich Hour Angle (G.H.A.) in degrees.

(2) Apply to the G.H.A an assumed longitude (nearest D.R. long.), which will make the local hour angle (L.H.A.) an integral number of degrees.

(3) Assume a latitude (integral degrees) nearest the D.R. latitude.

(4) Enter Table A with L.H.A. and with the assumed latitude and take out A and K. The H.A. is at the top, and L at left margin.

(5) Enter Table B with K~d and take out B. To find K~d, give K the sign of the latitude, and then combine K and the declination algebraically, i.e., the sums when signs are unlike, and the difference when the signs are alike.

(6) Enter Table B with A+B and take out the computed altitude; the degrees of altitude appearing at the bottom and the minutes of altitude at the right margin.

(7) The difference between the computed and the observed altitudes is the altitude difference ($H_c \sim H_o = a$); the altitude difference, "a", is measured from the assumed position toward the body when the H_o is greater than H_c, and away, when smaller. The line of position is at the distance, "a", from the assumed position and is laid off at right angles to the bearing of the body.

Note: The tables give an accuracy of solution to within 1′ of altitude, without interpolation, for closer results interpolate in Table B.

For the Azimuth:

(1) Enter left margin with H.A., or with 180°–H.A., if H.A. is over 90°.
(2) Then follow the horizontal line to the declination curve.
(3) Then follow the vertical line to the altitude curve.
(4) Then follow the horizontal line to right margin and pick off azimuth (Z).

For Naming the Azimuth:

(5) Give Z the name of the quadrant in which the body is found; for example, if body bears NW and Z is 80, Z = N80W, and Zn = 280.

SUN LINE

On the morning of 23 Feb. 1927, in D.R. Lat. 38–09–20 N, Long. 50–38–30 W, observed the sun bearing SE for a line of position as follows: W 8–37–45, C-W 3–40–45, chronometer slow 1^m50^s, H_s 23–30–00, I.C. (+) 1′—00″, ht. of eye 65 feet.

Solution

	h m s				
W	8–37–45			H_s	23–°30′.0
C-W	3–40–45			Ht. eye	(+) 6.0
C	12–18–30			Sub. C	(+) 0.2
CC (+)	1–50			IC	(+) 1.0
GCT	12–20–20.0 (23 Feb)			H_0	23–37.2
Eq T (−)	13–35.5				
GAT	12–06–44.5				
GHA (time)	0–06–44.5 W			d	10°–05′.4 S
GHA (degrees)	1–41.1 W			corr	(−) 0.3
Long (assumed)	50–41.1 W			d	10–05.1 S
LHA	49° E	A	9478	K	49–58.8 N
Lat (assumed)	38° N	B	30191	K∼d	60–03.9
		A+B	39669		

H_c 23–39.0
H_0 23–37.2
a # 1.8 Away

$Z = S\ 54°.2\ E$; $Z_n = 125°.8$ #.

STAR LINE

On 30 April 1927, during evening twilight, the navigator of a ship in D.R. Lat 37° 10′ N, Long. 15° 21′ W, observed the bright star, Sirius, bearing SW, for a line of position as follows: W 7–12–48, C-W 1–01–52, chronometer slow 1^m15^s, I. C. (+) 1′–00″, height of eye 65 feet, H_s 21–17–30.

Solution

	h m s				
W	7–12–48			H_s	21°–17′.5
C-W	1–01–52			IC	(+) 1.0
C	8–14–40			H	21 –18.5
CC (+)	1–15			Eye C	(−) 10.4
GCT	20–15–55.0 (30 Apr.)			H_0	21 –08.1
RAM ⊙	14–27–45.5				
T III	3–19.8				
GST	10–47–00.3				
RA Star	6–41–54.9				
GHA (time)	4–05–05.4				
GHA (degrees)	61–16–21 W				
Long (assumed)	15–16–21 W			d	16°–37′.1 S
LHA	46 W	A	8698	K	47 –19.7 N
Lat (assumed)	37 N	B	35738	K∼d	63 –56.8
		A+B	44436		

H_c 21–04.0
H_0 21–08.1
a # 4.1 Towards

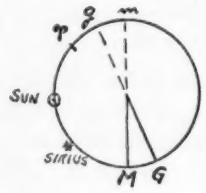
$Z = S\ 47°.7\ W$; $Z_n = 227°.7$ #.

Comparison of Methods

Problem: On 30 Apr. 1927 (PM), in D.R. Lat. 37°–10′ N Long. 15°–21′ W, observed Sirius bearing SW. W 7–12–48, C-W 1–01–52, C slow 1m15s, I.C. (+) 1′–00″, Eye 65 feet, H_s 21–17–30.

The Part Common to all Methods

W	7–12–48
C-W	1–01–52
	8–14–40
CC (+)	1–15
GCT	20–15–55.0 (30 Apr.)
RAM ⊙	14–27–45.5
T III	3–19.8
GST	10–47–00.3
RA Star	6–41–54.9
GHA	4–05–05.4



H_s	21°–17′–30
IC (+)	1–00
H	21–18–30
Eye C(−)	10–24
H_o	21–08–06
Dec.	16°–37′.1 S

Time Sight

h	21–08–06				
L_1	37–00–00 N	1 sec 10.09765	L_2	37–10–00 N	1 sec 10.09861
p	106–37–06	1 csc 10.01853			1 csc 10.01853
2	164–45–12				
S_1	82–22–36	1 cos 9.12274	S_2	82–27–36	1 cos 9.11799
S_1–h	61–14–30	1 sin 9.94283	S_2–h	61–19–30	1 sin 9.94318
GHA	4–05–05.4W	2 | 19.18175	GHA	4–05–05–.4W	2 | 19.17831
LHA	3–03–33.1W	sin½t 9.59088	LHA	3–02–47.3W	sin½t 9.58916
$Long_1$	1–01–32.3W = 15°–23′–05W″ #		$Long_2$	1–02–18.3 = 15°–34′–35″W #	

Aquino

a 43°–30′ G.H.A. 4–05–05.4 = 61°–16′.4 W tg 61°–16′.4 W

b 23 –13.0 t_A 45 –54.8 W Gdr 15 –21 .0 W

L 36 –47.0 H_o 21–08.1 G_A 15 –21.5 W t dr 45 –55 .4 W

C 60 H_o 21–16.0 Z_A S 47–37 W; Zn 227.6#.

a # 7.9 Away

(1) $\frac{\Delta b}{\frac{9.1}{42} \times \frac{60}{1} = 13}$

(2) $\frac{\Delta t_A}{\frac{9.1}{42} \times \frac{13}{1} = 2.8}$

Cosine-Haversine Method

							Azimuth		
GHA	4–05–05.4W			L 37.2 N			t	d	L
Long	1–01–24.0W			d 16.6 S	Base		132–48	132–48	132–48
LHA	3–03–41.4W	1hav	9.18237	t 3–03.7			130–46	133–27	133–05
Lat	37–10–00 N	1cos	9.90139				−2–02	+39	+17
d	16–37–06 S	1cos	9.98147				122	.6	.2
		1hav	9.06523	Base			.4	+23.4	+3.4
L∼d=	53–47–06	Nhav	.11621	132–48			−48.8	+3.4	
z	68–59–51	Nhav	.20459	−22			+26.8	+26.8	
H_c	21–00–09	Nhav	.32080	Z N132–26W			−22		
H_o	21–08–06			Zn 227–34 #					
a	# 7–57 Towards								

HO. 203

GHA	4 –05 –05.4W	LHA	3–07–43.0	37.1	Z 131.2		.029
LHA	3 –04 –26.4W	C(−)	3–16.6	5.3	C(+) 1.1		37
Long	1 –00 –39 W	LHA	3–04–26.4	1113	Z N132.3W		203
	=15°–09′–45″W#			1855	Zn 227.7#		87
	# a=8.1 Towards			196.63			1.073

Rust-Ogura

GHA 4 –05 –05.4 W
=61°–16′–21″W
$Long_A$ 15 –16 –21 W d 16°–37′.1S″
t 46W | A 8698 → K 47 –19 .7*N*
L 37N | B 35738 ← K ∼ d 63 –56 .7
A+B 44436 H_c 21–04.0
H_o 21–08.1
a # 4.1 Towards
Z S 47.7W Zn 227.7 #

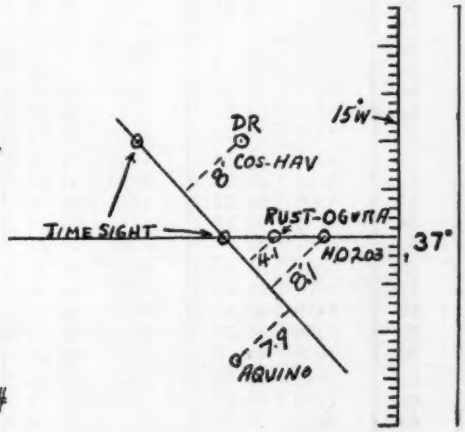


TABLE A

H.A. / Lat.	46°(3ⁿ 4ᵐ)		47°(3ⁿ 12ᵐ)		48°(3ⁿ 12ᵐ		49°(3ⁿ 16ᵐ)		50°(3ⁿ 20ᵐ)	
	A	K	A	K	A	K	A	K	A	K
0°	15823	0° 0′.0	16622	0° 0′.0	17449	0° 0′.0	18306	0° 0′.0	19193	0° 0′.
1	15815	1 26.4	16614	1 28.0	17440	1 29.7	18297	1 31.4	19183	1 33.
2	15794	2 52.7	16591	2 55.9	17416	2 59.2	18271	3 2.8	19155	3 6.
3	15759	4 18.9	16553	4 23.7	17376	4 28.7	18227	4 34.0	19109	4 39.
4	15709	5 44.9	16500	5 51.2	17319	5 58.0	18166	6 5.0	19043	6 12.
5	15646	7 10.6	16433	7 18.6	17246	7 26.9	18088	7 35.8	18959	7 45.
6	15570	8 36.2	16351	8 45.7	17158	8 55.6	17994	9 6.1	18858	9 17.
7	15480	10 1.4	16254	10 12.4	17054	10 23.9	17883	10 36.0	18740	10 48.
8	15376	11 26.2	16143	11 38.6	16936	11 51.7	17756	12 5.5	18604	12 20.
9	15260	12 50.6	16019	13 4.5	16803	13 19.0	17614	13 34.4	18452	13 50.
10	15132	14 14.6	15882	14 29.8	16656	14 45.8	17456	15 2.6	18283	15 20.
11	14991	15 38.0	15731	15 54.5	16495	16 11.9	17284	16 30.2	18099	16 49.
12	14839	17 0.8	15568	17 18.6	16321	17 37.4	17098	17 57.1	17899	18 17.
13	14675	18 23.0	15393	18 42.1	16134	19 2.1	16898	19 23.2	17685	19 45.
14	14501	19 44.7	15206	20 4.9	15935	20 26.2	16685	20 48.5	17459	21 12.
15	14317	21 5.6	15009	21 26.9	15725	21 49.4	16461	22 13.0	17220	22 37.
16	14123	22 25.8	14803	22 48.3	15504	23 11.8	16226	23 36.5	16968	24 2.
17	13919	23 45.3	14586	24 8.8	15272	24 33.4	15979	24 59.2	16705	25 26.
18	13706	25 4.1	14360	25 28.5	15031	25 54.0	15722	26 20.9	16432	26 49.
19	13485	26 22.0	14125	26 47.3	14781	27 13.8	15456	27 41.5	16148	28 10.
20	13257	27 39.2	13881	28 5.3	14522	28 32.6	15181	29 1.3	15856	29 31.
21	13021	28 55.5	13631	29 22.4	14255	29 50.5	14898	30 20.0	15555	30 50.
22	12779	30 11.0	13373	30.38.6	13982	31 7.4	14607	31 37.6	15247	32 9.
23	12531	31 25.6	13109	31 53.9	13702	32 23.4	14310	32 54.2	14932	33 26.
24	12277	32 39.4	12840	33 8.3	13416	33 38.3	14007	34 9.7	14611	34 42.
25	12018	33 52.3	12565	34 21.7	13125	34 52.3	13699	35 24.3	14284	35 57.
26	11755	35 4.4	12286	35 34.2	12830	36 5.3	13386	36 37.7	13953	37 11.
27	11487	36 15.6	12003	36 45.8	12530	37 17.3	13069	37 50.1	13618	38 24.
28	11216	37 25.9	11716	37 56.5	12227	38 28.3	12748	39 1.4	13280	39 35.
29	10942	38 35.3	11427	39 6.2	11921	39 38.3	12425	40 11.7	12939	40 46.
30	10666	39 43.8	11135	40 15.0	11612	40 47.3	12100	41 20.9	12595	41 55.
31	10387	40 51.5	10841	41 22.8	11302	41 55.4	11773	42.29.1	12250	43 4.
32	10107	41 58.4	10545	42 29.8	10991	43 2.5	11444	43 36.3	11905	44 11.
33	9826	43 4.3	10248	43 35.9	10679	44 8.6	11115	44 42.5	11559	45 17.
34	9544	44 9.4	9951	44 41.0	10366	45 13.8	10787	45 47.7	11213	46 22.
35	9261	45 13.7	9654	45 45.3	10053	46 18.0	10458	46 51.9	10868	47 26.
36	8979	46 17.1	9357	46 48.7	9740	47 21.3	10130	47 55.1	10524	48 30.
37	8698	47 19.7	9061	47 51.2	9429	48 23.8	9803	48 57.4	10181	49 32.
38	8417	48 21.5	8766	48 52.9	9120	49 25.3	9478	49 58.8	9841	50 33.
39	8137	49 22.6	8472	49 53.8	8812	50 26.0	9155	50 59.2	9503	51 33.
40	7859	50 22.8	8180	50 53.8	8506	51 25.8	8834	51 58.8	9167	52 32.
41	7583	51 22.3	7890	51 53.0	8202	52 24.8	8516	52 57.5	8834	53 31.
42	7308	52 21.0	7603	52 51.5	7901	53 23.0	8202	53 55.3	8506	54 28.
43	7036	53 19.0	7318	53 49.2	7603	54 20.3	7890	54 52.4	8181	55 25.
44	6767	54 16.3	7036	54 46.2	7308	55 16.9	7582	55 48.6	7859	56 21.
45	6501	55 12.9	6757	55 42.4	7017	56 12.7	7278	56 44.0	7542	57 16.
46	6238	56 8.7	6483	56 37.9	6730	57 7.8	6979	57 38.6	7230	58 10.
47	5979	57 3.9	6212	57 32.7	6447	58 2.2	6684	58 32.5	6922	59 3.
48	5723	57 58.5	5945	58 26.8	6168	58 55.9	6393	59 25.7	6619	59 56.
49	5471	58 52.4	5682	59 20.3	5894	59 48.9	6108	60 18.2	6322	60 48.
50	5223	59 45.8	5423	60 13.2	5625	60 41.2	5827	61 10.1	6030	61 39.
51	4980	60 38.5	5169	61 5.4	5360	61 32.9	5551	62 1.2	5744	62 30.
52	4741	61 30.6	4920	61 57.0	5100	62 24.0	5281	62 51.7	5463	63 20.
53	4506	62 22.2	4676	62 48.0	4846	63 14.5	5017	63 41.6	5188	64 9.
54	4276	63 13.2	4437	63 38.5	4597	64 4.4	4758	64 30.9	4920	64 58.
55	4052	64 3.7	4203	64 28.4	4354	64 53.7	4506	65 19.6	4659	65 46.
56	3833	64 53.7	3975	65 17.8	4117	65 42.5	4260	66 7.8	4403	66 33.
57	3619	65 43.1	3752	66 6.7	3885	66 30.8	4019	66 55.4	4153	67 20.
58	3410	66 32.1	3535	66 55.1	3659	67 18.6	3785	67 42.5	3910	68 7.
59	3206	67 20.7	3323	67 43.0	3439	68 5.8	3557	68 29.0	3674	68 52.
60	3008	68 8.8	3117	68 30.5	3226	68 52.6	3336	69 15.3	3445	69 38.
61	2816	68 56.4	2918	69 17.5	3019	69 39.0	3121	70 1.0	3223	70 23.
62	2630	69 43.7	2725	70 4.1	2818	70 24.9	2913	70 46.2	3008	71 7.
63	2449	70 30.5	2537	70 50.3	2624	71 10.4	2712	71 31.0	2800	71 51.
64	2274	71 17.0	2355	71 36.1	2436	71 55.5	2518	72 15.4	2598	72 35.
65	2105	72 3.1	2180	72 21.5	2255	72 40.3	2330	72 59.4	2404	73 18.
Lat. / H.A.	A	180°−K	A	180°−K	A	180°−K	A	180°−K	A	180°−K
	134°(8ⁿ 56ᵐ)		133°(8ⁿ 52ᵐ)		132°(8ⁿ 48ᵐ)		131°(8ⁿ 44ᵐ)		130°(8ⁿ 40ᵐ)	

TABLE B

Knd	60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	MIN. ALT
0	30103	31443	32839	34295	35816	37405	39069	40812	42642	44567	60
1	30125	31466	32863	34320	35842	37432	39097	40842	42674	44600	59
2	30147	31488	32887	34345	35868	37459	39125	40872	42705	44633	58
3	30169	31511	32910	34370	35894	37487	39154	40902	42736	44666	57
4	30191	31534	32934	34395	35920	37514	39182	40931	42768	44699	56
5	30213	31557	32958	34420	35946	37541	39211	40961	42799	44732	55
6	30235	31580	32982	34444	35972	37568	39239	40991	42831	44765	54
7	30257	31603	33006	34469	35998	37595	39268	41021	42862	44798	53
8	30279	31626	33030	34494	36024	37623	39296	41051	42893	44831	52
9	30301	31649	33054	34519	36050	37650	39325	41081	42925	44864	51
10	30323	31672	33078	34544	36076	37677	39354	41111	42956	44898	50
11	30345	31695	33101	34569	36102	37704	39382	41141	42988	44931	49
12	30367	31717	33125	34594	36128	37732	39411	41171	43020	44964	48
13	30389	31740	33149	34619	36154	37759	39439	41201	43051	44997	47
14	30411	31763	33173	34644	36180	37786	39468	41231	43083	45031	46
15	30433	31787	33197	34669	36206	37814	39497	41261	43114	45064	45
16	30455	31810	33221	34694	36233	37841	39526	41291	43146	45097	44
17	30477	31833	33245	34719	36259	37869	39554	41322	43178	45131	43
18	30499	31856	33269	34745	36285	37896	39583	41352	43210	45164	42
19	30521	31879	33294	34770	36311	37924	39612	41382	43241	45198	41
20	30544	31902	33318	34795	36338	37951	39641	41412	43273	45231	40
21	30566	31925	33342	34820	36364	37979	39669	41443	43305	45265	39
22	30588	31948	33366	34845	36390	38006	39698	41473	43337	45298	38
23	30610	31971	33390	34870	36417	38034	39727	41503	43369	45332	37
24	30632	31994	33414	34896	36443	38061	39756	41533	43401	54365	36
25	30655	32018	33438	34921	36469	38089	39785	41564	43432	45399	35
26	30677	32041	33463	34946	36496	38117	39814	41594	43464	45433	34
27	30699	32064	33487	34971	36522	38144	39843	41625	43496	45466	33
28	30721	32087	33511	34997	36549	38172	39872	41655	43528	45500	32
29	30744	32110	33535	35022	36575	38200	39901	41686	43560	45534	31
30	30766	32134	33559	35047	36602	38227	39930	41716	43592	45567	30
31	30788	32157	33584	35073	36628	38255	39959	41747	43625	45601	29
32	30811	32180	33608	35098	36655	38283	39988	41777	43657	45635	28
33	30833	32204	33632	35123	36681	38311	40017	41808	43689	45669	27
34	30856	32227	33657	35149	36708	38338	40046	41838	43721	45703	26
35	30878	32250	33681	35174	36734	38366	40076	41869	43753	45737	25
36	30900	32274	33705	35200	36761	38394	40105	41899	43785	45771	24
37	30923	32297	33730	35225	36787	38422	40134	41930	43818	45805	23
38	30945	32320	33754	35251	36814	38450	40163	41961	43850	45839	22
39	30968	32344	33779	35276	36841	38478	40192	41992	43882	45873	21
40	30990	32367	33803	35302	36867	38506	40222	42022	43915	45907	20
41	31013	32391	33827	35327	36894	38534	40251	42053	43947	45941	19
42	31035	32414	33852	35353	36921	38562	40280	42084	43979	45975	18
43	31058	32438	33876	35378	36848	38589	40310	42115	44012	46009	17
44	31080	32461	33901	35404	36974	38618	40339	42145	44044	46043	16
45	31103	32485	33925	35429	37001	38646	40368	42176	44077	46078	15
46	31125	32508	33950	35455	37028	38674	40398	42207	44109	46112	14
47	31148	32532	33975	35481	37055	38702	40427	42238	44142	46146	13
48	31171	32555	33999	35506	37082	38730	40457	42269	44174	46181	12
49	31193	32579	34024	35532	37108	38758	40486	42300	44207	46215	11
50	31216	32602	34048	35558	37135	38786	40516	42331	44239	46249	10
51	31238	32626	34073	35583	37162	38814	40545	42362	44272	46284	9
52	31261	32650	34098	35609	37189	38842	40575	42393	44305	46318	8
53	31284	32673	34122	35635	37216	38871	40604	42424	44337	46353	7
54	31306	32697	34147	35661	37243	38899	40634	42455	44370	46387	6
55	31329	32720	34172	35687	37270	38927	40664	42486	44403	46422	5
56	31352	32744	34196	35712	37297	38955	40693	42518	44436	46456	4
57	31375	32768	34221	35738	37324	38984	40723	42549	44468	46491	3
58	31397	32792	34246	35764	37351	39012	40753	42580	44501	46525	2
59	31420	32815	34271	35790	37378	39040	40782	42611	44534	46560	1
60	31443	32839	34295	35816	37405	39069	40812	42642	44567	46595	0
	29°	28°	27°	26°	25°	24°	23°	22°	21°	20°	MIN. ALT

ALTITUDE Hc

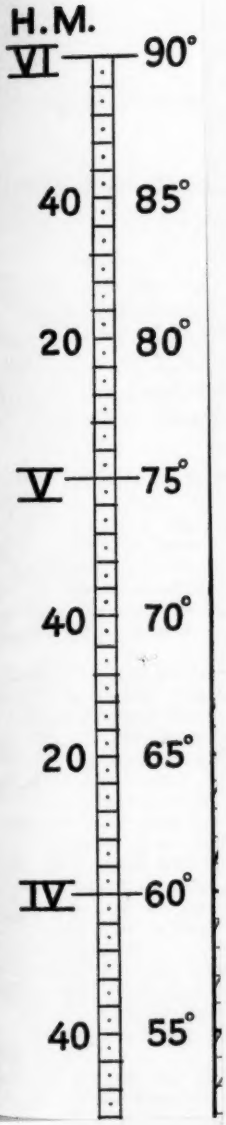
We have found that due to the uniformity and simplicity of the tables and to the brevity of the solution, surprisingly few mathematical errors are made. To quote Captain Rust, "Every unnecessary figure used takes time and affords an opportunity for a mistake." A table of comparisons of several methods is given to show the advantages of this method, though this table does not tell the whole story for the reason that the steps in this method are easier than those of most of the other tables. For instance, all entries are made with integral values and without interpolations for an accuracy of solution of plus or minus 0′.5, and there are no complications to throw the navigator off the track.

The fact that the azimuth is found independently, leaves the computation of H_c as the sole operation in many cases.

Method	Common to all	No. of interpolations	Position used	No. of logs	Pages of tables	No. of entries	Special Operations	Remarks
Cosine-Haversine		6	DR	7	149	6	1 Addition—3 Figures 1 Addition—2 Figures 1 Subtraction— $90° - p = H_c$	No Z_n Found
Time Sight	$H°$	5	DR	5	149	5	1 Addition—3 Figures 1 Division by 2. 1 Subtraction, $S_1 - H$ Conbime L∼d	t must exceed 1 hr. No Z_n Found
Aquino 1st method	and	2	Assumed	0	90	3	Combine L and b 1 Subtraction—time	
H.O. 203	Dec,	2	Do	0	1521	1	1 Subtraction	t must exceed 1 hr.
Rust-Ogura	t_1	0 to ±0′.5	Do	0	27	3	Combine K∼d 1 Addition—2 Figures	Find Z_n seperately

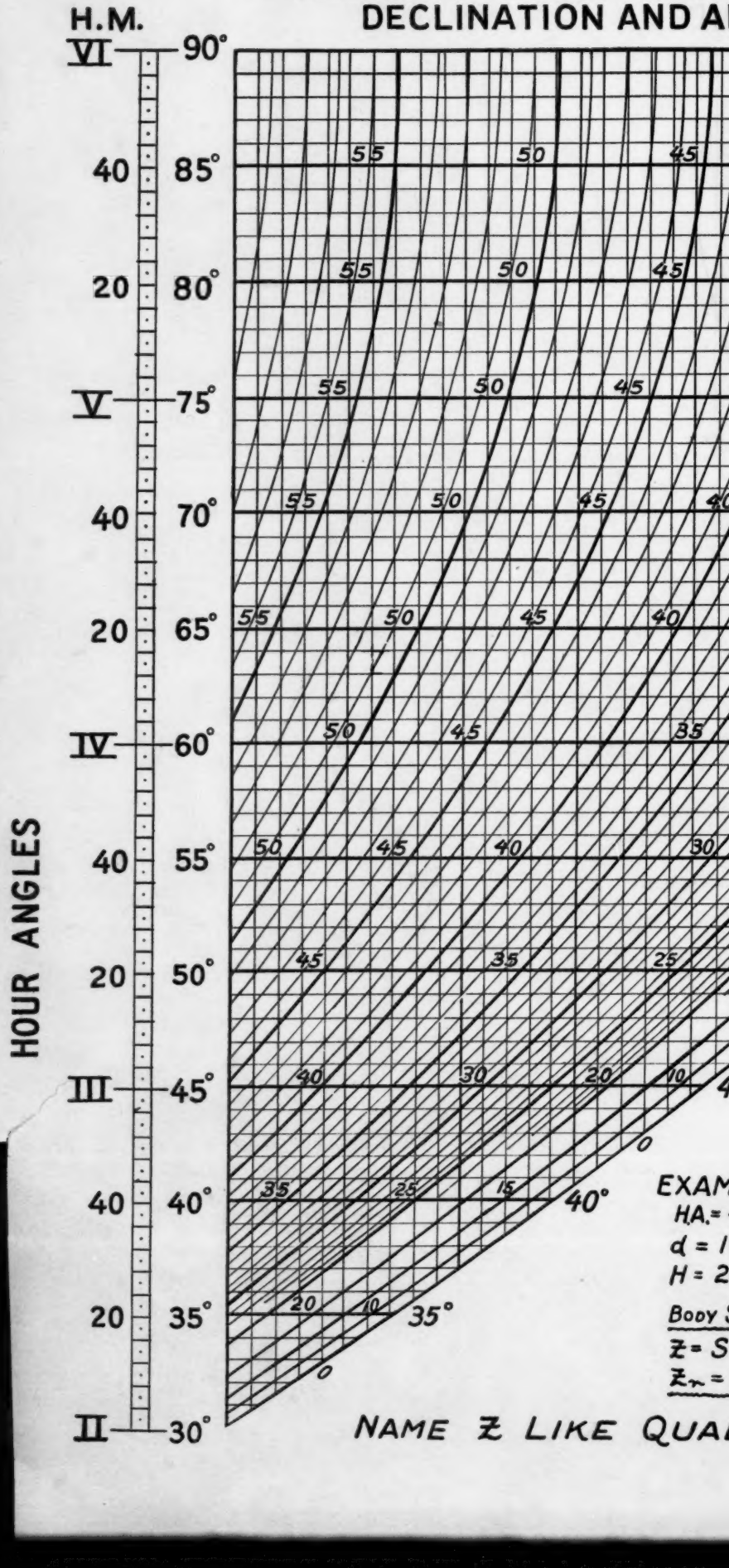
To summarize the advantages of this method, we have:

(1) Accuracy
(2) Brevity
(3) Simplicity
(4) No interpolation for accuracy of solution to within 1′.
(5) One uniform solution for all bodies under all conditions.
(6) One 44 page book and Nautical Almanac suffice to find H_c and Z_n.
(7) 27 pages of tables used, to 90 for Aquino, 149 for Cos-hav. and for time sight, and 1521 for H.O. 203–4.
(8) Logs simplified and in form of simple numbers, e.g., 22.5.
(9) Tables are uniform and free from complicated headings.
(10) System is elastic, since either H_c or Z_n may be found separately.
(11) Z_n found from one set of uniform curves without instruments.
(12) Z_n found with equal facility for either D.R. or assumed position.

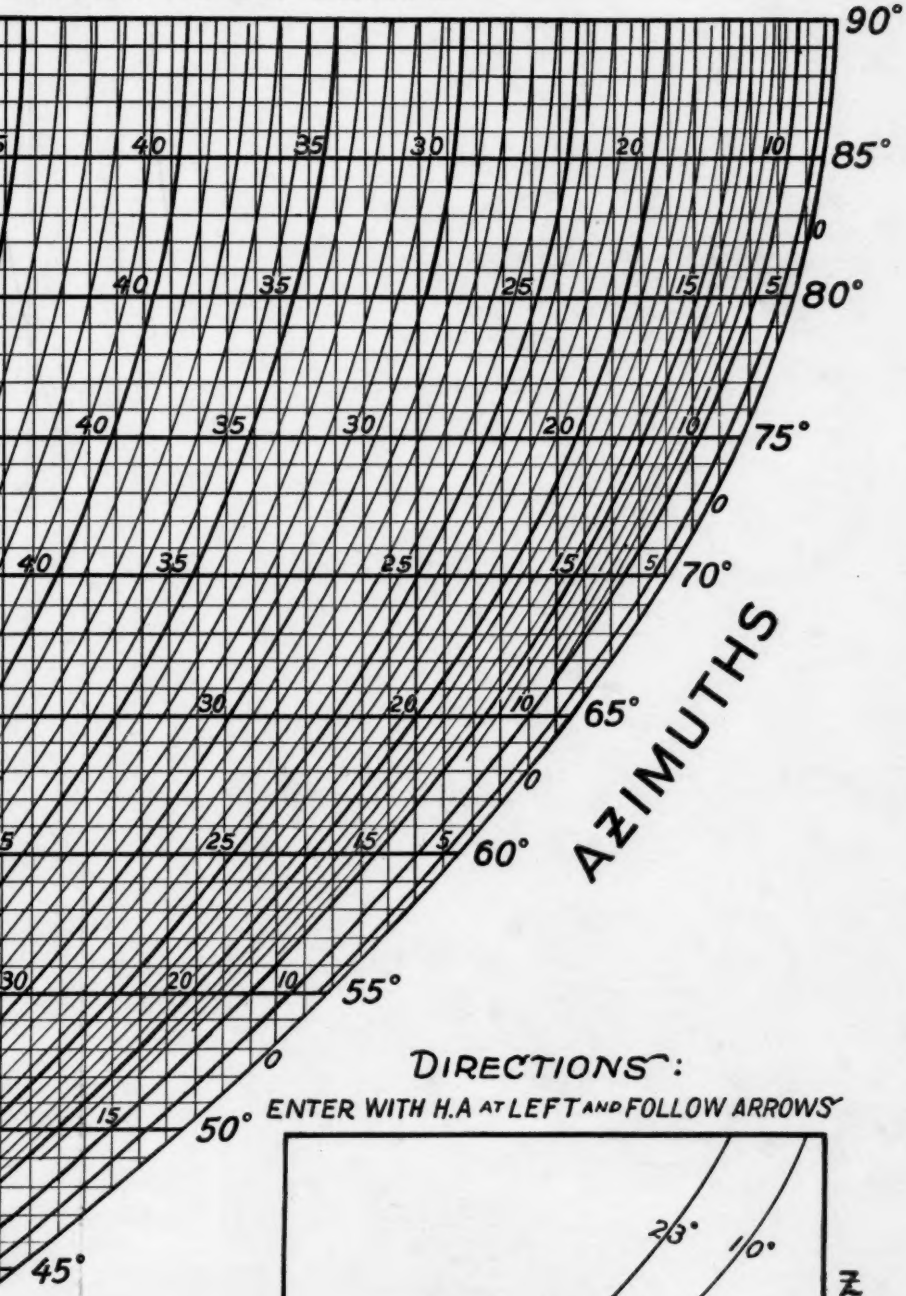

H.M.
VI
90°
40
85°
20
80°
V
75°
40
70°
20
65°
IV
60°
40
55°

AZIMUTH DIAGRA

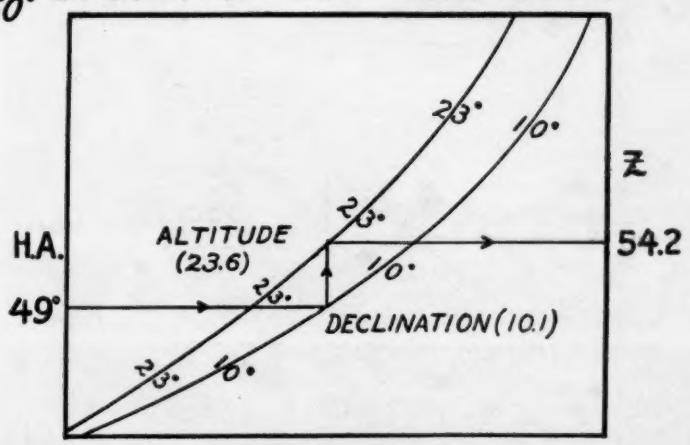
DECLINATION AND A



RAM – RIGHT HALF
ALTITUDE ON CURVE

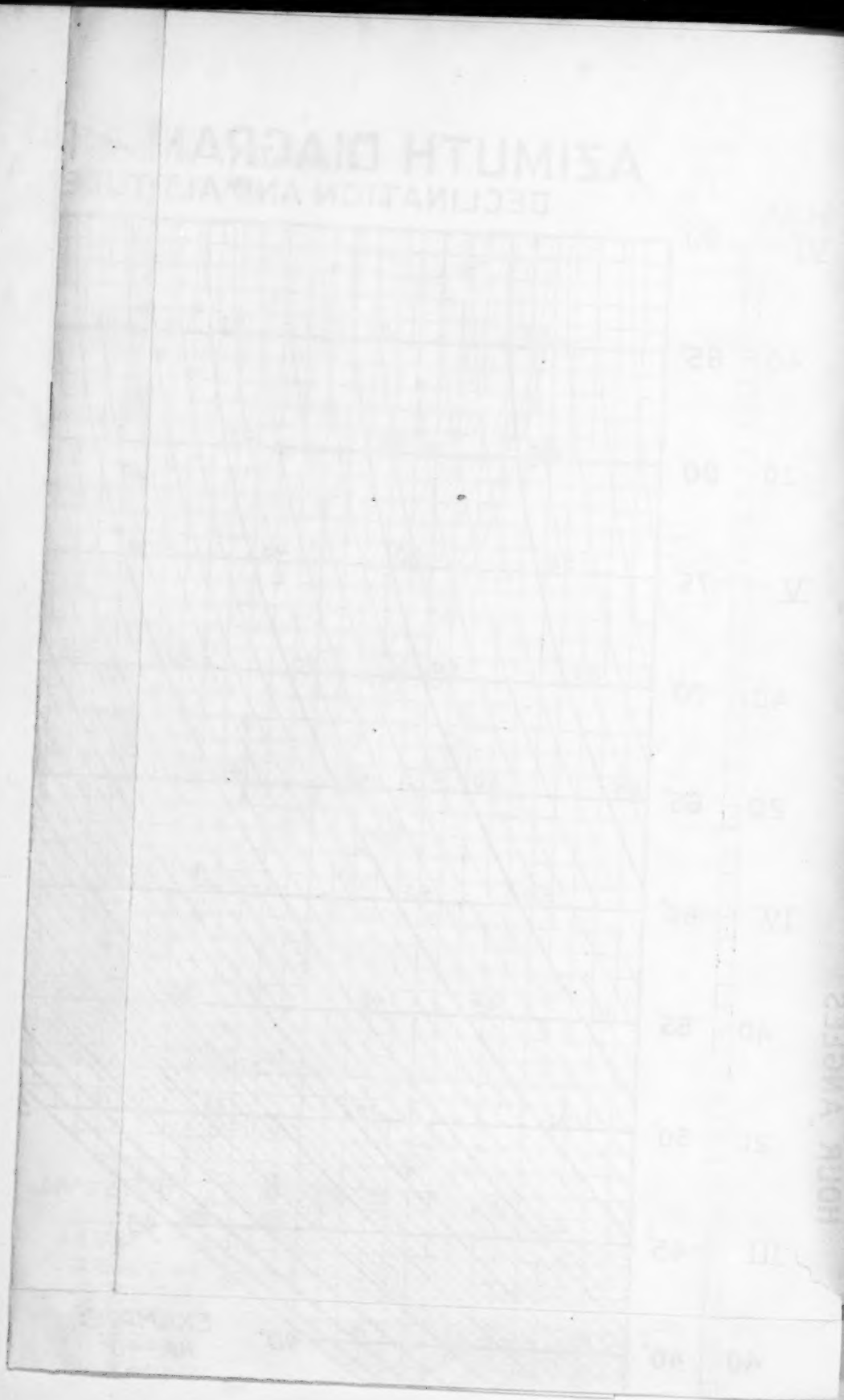


DIRECTIONS:
ENTER WITH H.A AT LEFT AND FOLLOW ARROWS



AMPLE:
A.= 49°
= 10.1
= 23.6
DY S AND E
= S54.2E
= 125.°8 #

ADRANT IN WHICH BODY IS FOUND



Discussion

Dirigible Metal Found to be Poor

(See page 464, April, 1927, PROCEEDINGS)

EDITOR'S NOTE.—The Editor has been furnished by the Chief of Bureau of Aëronautics, Navy Department, with a copy of a letter received by that official from George L. Clark, Research Laboratory of Applied Chemistry, Massachusetts Institute of Technology, Cambridge, Massachusetts, as follows:

There has appeared in the newspapers yesterday and today an account of a supposed exclusive interview with the New Haven *Register* in which the statement was attributed to me that the disaster of the *Shenandoah* was due to faulty metal. Please permit me to inform you that this newspaper item is erroneous, and that no interview was obtained by the New Haven *Register* or any other paper.

On February 15, I addressed the Civil Engineers Society in New Haven upon the subject of our X-ray investigation upon the structure of materials, and upon the differentiation between satisfactory and unsatisfactory specimens. Numerous examples of metals were presented. A question was asked me whether the *Shenandoah* failure was due to the metal, and the reply was that there is no direct evidence whatsoever that this was the case but that the X-ray method was now available for the very careful study of all materials which might be subjected to any sort of severe conditions. This simple statement was twisted into the newspaper article as it appeared.

I am presenting these facts so that you may rest assured that there has been no intention at any time of criticising or calling into question the methods of testing and of construction used by the government.

I am sorry indeed that this misleading article has appeared at the time when we are all trying to contribute our best efforts to a profound knowledge of the structures of materials, and I sincerely hope that the Bureau of Aëronautics will not be innocently embarrassed on this account.

Delivery of Man to Foreign Civil Officials

(See page 2327, November, 1926, PROCEEDINGS)

The Editor has received the following comment from the Commander, Naval Forces, Europe, Vice Admiral G. H. Burrage, U. S. Navy:

1. On August 26, 1926, Emilio Paredes, mess attendant second class, was shot by LeBon Emanuel Smith, gunner's mate first class. Paredes died a few days later. Both men were attached to the U.S.S. *Lardner*, then at Gravesend, England. Both men were ashore on liberty at the time of the shooting. It will thus be seen that the scene of the crime was in foreign territory.

2. On August 27, 1926, the civil police authorities came on board the U.S.S. *Lardner* with a warrant for the arrest of Smith. The Commanding Officer of the *Lardner* refused to allow the warrant to be served and refused to give Smith up to the police authorities.

3. In the U.S. NAVAL INSTITUTE PROCEEDINGS for the month of November, 1926, under Professional Notes, there appeared, under the heading "Naval Rights," a quotation from the *Naval and Military Record*. of September 8, concerning the refusal of the Commanding Officer to deliver up Smith to the English authorities. Particular attention is invited to that part of the article which reads. "The course taken by the commanding officer of the *Lardner* was justified but unusual."

4. The Commander, Naval Forces, Europe, is of the opinion that the commanding officer of the *Lardner* took the only logical course. The U.S. NAVAL INSTITUTE PROCEEDINGS is read by a great number of officers in the naval service. Due to the character of this publication, officers are inclined to rely upon the information contained therein. Consequently a number of officers may have obtained an erroneous impression of the course which should be followed in a situation of this kind. The course to be followed where a foreign government is involved is not covered by *Naval Courts and Boards*.

5. It is believed that Chapter III, *Naval Courts and Boards*, should be so changed as to show specifically the course to be taken by

the commanding officer of the naval vessel when a demand is made upon him for delivery to foreign civil authorities of any person in his custody. Probably most commanding officers would naturally follow the proper course from what is said concerning state and federal authorities in Chapter III, *Naval Courts and Boards*. Some commanding officers might fail to do so, however, and the department be seriously embarrassed thereby. When a foreign government is involved it is very important that the actions of naval officers be in accordance with law. Hence specific instructions are desirable.

Adventures of Old Glory

(See page 318, March, 1927, PROCEEDINGS)

HENRY W. BELKNAP.—I venture to suggest that William E. Beard has overlooked one very interesting occasion of the display of "Old Glory" in his article in your March issue.

On July 4 in Paris during the exposition of 1900, the American flag flew from the top of the Eiffel tower all day, the occasion being the unveiling of the statues of Washington and Lafayette when John Philip Sousa's superb band officiated at both ceremonies, marching from the Trocadero to the Tuilleries and thence through the Avenue de l'Opera to the Place de l'Opera where the band played continuously until daylight the next morning.

If my memory serves me this was said to be the first time that a foreign military organization had traversed the streets of Paris.

The Naval Officer in Diplomacy

(See Editor's Note, page 309, March, 1927, PROCEEDINGS)

Admiral Knapp relieved Admiral Sims after the Armistice, but the former became Military Governor of Santo Domingo in 1916 *not* after the Armistice. Acknowledgement is made to Commander Ralph Whitman (CEC), U.S. Navy, for calling our attention to the error.

The Case for the Capital Ship

(See page 2473, December, 1926, PROCEEDINGS)

The editor's attention has been called to what was apparently a misstatement of fact in the article referred to above, in which the author stated that the 16-inch guns of the *Colorado* class of battleships could hurl a projectile weighing a ton a distance of thirty-five miles. When this was referred to the author, he asked that a correction be made, as the error was a typographical one and should have read thirty-five thousand yards.

Historic Ships of the Navy

(See page 171, February, 1927, PROCEEDINGS)

REAR ADMIRAL A. W. GRANT, U. S. NAVY, RETIRED.—Referring to the February, 1927, PROCEEDINGS, under "Historic Ships of the Navy," the following appears:

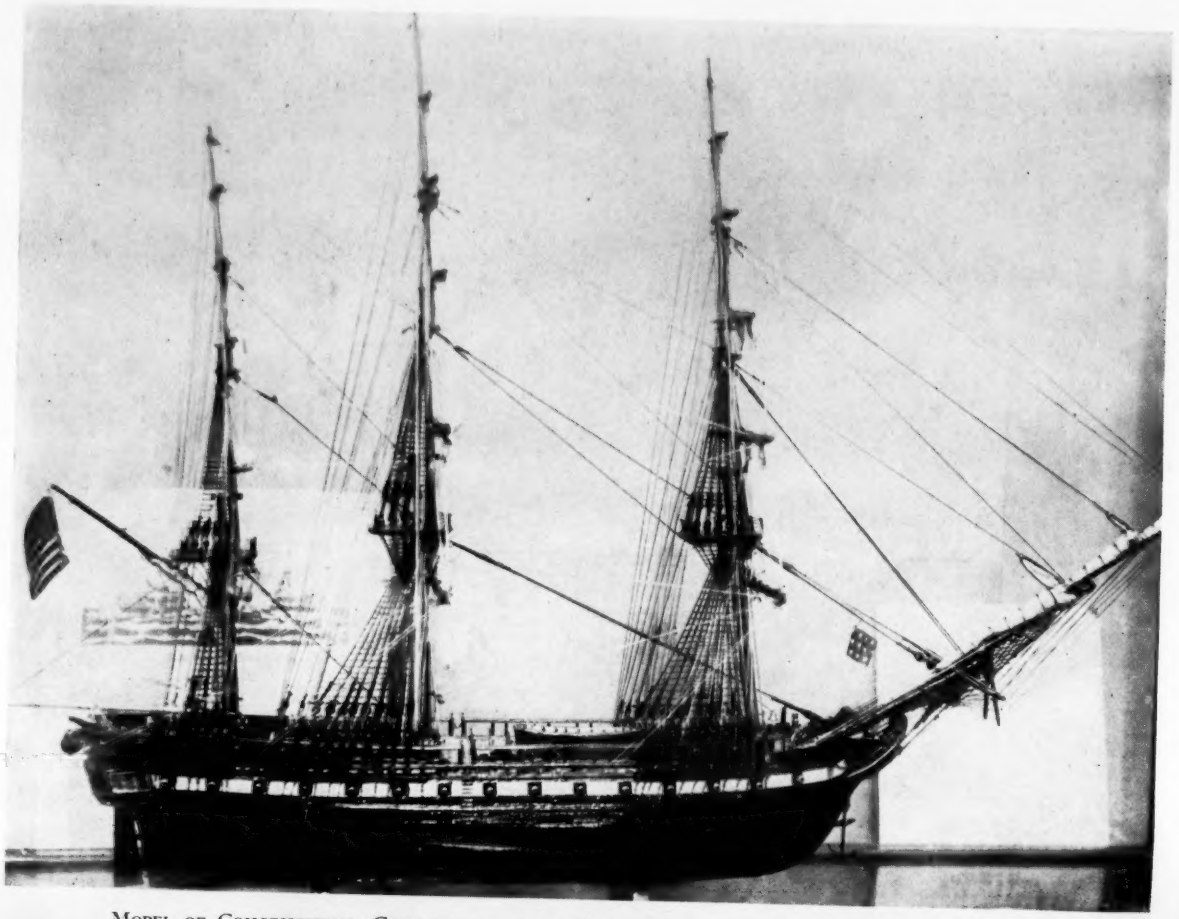
> This cruise lasted four years, under several commanders. Captain Joseph G. Eaton (1902) took her out to the Philippines, but that summer he turned her over to Captain Frank T. Burwell (August 29, 1902).

As I was executive officer of the *Oregon* during the period referred to, I think it well to correct the errors underscored. The *Oregon* remained at the Navy Yard, Puget Sound, from April, 1901, until September, 1902. During this period she was thoroughly overhauled and the temporary repairs made to her bottom in Nagasaki were made substantial in the Bremerton drydock.

During 1902 while at the Navy Yard, Puget Sound, she was under command of Captain Joseph G. Eaton until August of that year. He was never in command of her at sea, nor did he take her to the Philippines. He was relieved of command by Captain William T. Burwell (not Frank T. Burwell).

During the return voyage to the China station in November, 1902, when approximately half way between Honolulu and Yokohama the *Oregon* encountered an exceedingly severe storm and came very nearly foundering. The damages sustained at this time were so great that she spent two months at the Uraga Dock Yard, near Yokusuka, Japan, undergoing repairs. She joined the flagship *Kentucky* (Admiral Evans) in Hongkong about March, 1903, and returned north with the flag, stopping at Amoy, Shanghai, Nagasaki, Kobe and Yokohama, and early in the summer of 1903 went to Chefoo. During the autumn of 1903, the *Kentucky* and *Oregon* made a trip to Honolulu, and in January, 1904, arrived in Manila.

UNIV. OF MICH.



MODEL OF CONSTITUTION, CONSTRUCTED ON A SCALE OF ⅛ INCH TO THE FOOT BY GEORGE D. FLEURY, 1426 N. EDGEWOOD STREET, PHILADELPHIA, PA. SEE PAGE 607

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Professional Notes

3 March to 3 April

Compiled by

Lieutenant Commander W. G. Greenman, U. S. Navy

Assisted by

Assistant Professor Henry Bluestone, U. S. Naval Academy

GENERAL ARRANGEMENT

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UNITED STATES

Naval Disarmament To Date

New York *Times,* 9 March.—It is not strange that the President's plans for a naval disarmament conference have seemed to be somewhat uncertain and confused. At one time White House statements indicated that the whole scheme would have to be abandoned, with France and Italy refusing to coöperate. Then hope was plucked up, and it was announced that the Administration would concentrate on a three-power naval treaty. Yesterday it was stated that a new and definite proposal has been made to Great Britain and Japan to confer with the United States at Geneva some time after the first of June. This is three months later than the date originally urged by the President. In the meantime the endeavor will be made to induce the French and Italian Governments to reconsider their adverse decision, and at least to consent to discuss naval matters with America, Japan and Great Britain at Geneva. If, in all this record, there appears to be a certain amount of vacillation and feeling the way, the explanation is that the President, like Abraham Lincoln, does not profess to be able to control events; he follows them. In the official report from Washington it is frankly, even innocently, set down that Mr. Coolidge, in case his first ideas about naval disarmament do not prove feasible, is always "anxious to do the next best thing."

As for cruisers, the numbers of which the President specifically wished to cut down, their building goes merrily ahead. Our own Navy Department has just invited bids for six new ones. The British Admiralty is perfectly willing to confer about cruisers, but sees the sole probable result to be that England will demonstrate that she needs all she has, and will be very glad to see the United States add enough of them to keep up with the British ratio. On the other hand, the Japanese Government has pretty plainly intimated that it will not be willing to accept in the matter of cruisers the ratio inferior to that of England and the United States to which it agreed at the Washington Conference in the matter of cruisers.

All told, therefore, the outlook for the President's original program is not very flattering. It would be a rather sorry issue of a conference called to reduce cruisers if its recommendation was that more should be built. Nor can the case for other classes of naval auxiliaries be described as brighter. It is not impossible that in the end the whole matter will have to be referred back to the League of Nations and to its effort to work out slowly a plan for all-round disarmament in which all the nations may find it to their account to acquiesce.

An Admiral Diplomat

New York *Times,* 23 March.—News that Admiral Bristol is soon to be relieved of his duties as High Commissioner at Constantinople, and to be made Commander-in-Chief of our Asiatic Fleet, should not pass without a word in praise of a remarkable diplomatic service. Ever since the war Admiral Bristol has been detailed to duties for which naval officers are not supposed to be trained. But in a very difficult position, with all kinds of vexing and complicated questions thrust upon him, he has so borne himself as to win plaudits from his superior officers and from the Department of State. In 1924 Secretary Hughes wrote a letter to the Navy Department speaking in high terms of "the skill and patience with which Admiral Bristol had conducted the negotiations." The reference was to an agreement to pass upon the claims of Americans and Turks growing out of the war.

The Admiral has been in Constantinople, at the meeting point of all nationalities. In some respects his position was irregular, certainly it was delicate, inasmuch as the United States had not re-established diplomatic relations with Turkey. But as High Commissioner he was able to keep in touch with the Turkish Government, to watch over the rights of American residents, and to secure, by his courtesy and sagacity favorable treatment for our missions and schools in Turkey. To all visiting Americans, Admiral Bristol has shown himself a model of hospitality and kindness. Doubtless he will return to high command at sea with the satisfaction that goes with a professional career. But he must know that he has made his mark as a diplomatic servant of his Government, and has left enduring recollections with all of his fellow-citizens who have had occasion at Constantinople to make proof of his genial and gentlemanly qualities.

Developing the American Merchant Marine

Christian Science Monitor, 2 March.—The fact that 1,100 vessels of the United States Shipping Board have been sold during the past six years, for which $81,000,000 has been received, is not in itself an indication that the American merchant marine is expanding. Many of the vessels sold have been broken up for junk, while a number of those remaining to be sold—a large majority would be more accurate—are in such a condition today that it would cost more to make them ready for sea than they are worth. The shipping board still has 800 vessels for sale, its chairman, T. V. O'Connor, recently indicated.

Out of a war-time fleet, the size of which is denoted by the above figures, the United States has a negligible merchant marine in operation today, if comparison is made with the fleets of other maritime nations. If the contrast is based upon new tonnage under construction, the results are no more favorable to the United States, for among the maritime nations of Europe, not to mention Japan, an intensive program of new construction is under way. In fact, it has reached the proportions of a race for supremacy, in which the Italians and the Germans are competing to build the fastest passenger ships for the transatlantic service, while the British, French and Swedish merchant fleets are being increased by new vessels. Government aid is extended in almost every instance, in the construction of new tonnage abroad, but the mention of a subsidy to place the American merchant marine in a position actively to compete with foreign nations for freight and passenger traffic is viewed with disapproval in many official quarters.

The United States Shipping Board, in the course of its statistical compilations, recently completed a study of foreign trade for the first six months of 1926. During that period, 56,000,000 tons of ocean-borne foreign overseas cargo entered and left the ports of the United States. American ships handled scarcely more than one-third of the total tonnage—import and export combined. Of this 56,000,000 tons, less than 20,000,000 tons was carried on American flag ships, both shipping board and independent. British ships carried almost as large a proportion of the foreign business of the United States as the latter's own ships did, or 18,500,000 tons, with the remainder divided among various other nationalities. The showing is one in which interested Americans cannot take great pride. Efforts have been made to induce merchants who control the routing of their freight to patronize American ships, and while the earnest appeals of the shipping board have been helpful, the results have not been all that might be expected from an appeal which is, essentially, based on patriotic grounds. The cargo-carrying fleet comprises 1,512 vessels.

In the passenger trade, the situation is no more encouraging. The board's reports on the employment of American ships state that there are thirty-nine American vessels engaged in foreign overseas service, with five tied up, these being, of course, combined passenger and freight carriers. Of the total, approximately 75 per cent are privately owned, twenty-nine ships being maintained by American operators in routes to Europe, to South America, to Asia and Australia, and around the world. If a comparison were made of the total number of American passenger with those of other nations, the results would be surprising. There are more than twenty-nine British passenger ships—the majority of them comparatively new vessels—entering the port of New York alone, engaged in service between that point and ports on the English Channel.

Of America's fleet of twenty-nine independently owned ships, augmented by ten shipping board vessels, seventeen are operated by one company, the Dollar Line, which has done its part toward carrying the flag of the United States to foreign ports. Of the remaining twelve, four ships ply to the east coast of South Africa and another four to the west coast. Three ply between San Francisco and the Antipodes and one is under the control of a company most of whose ships are British-flag vessels (the International Mercantile Marine). The ten Government-owned ships are in the transatlantic service.

This is the story of the American merchant marine. No definite plan of replacement is under way; little effort is made to encourage new ship construction. The ships will not last forever and unless replacements are made, and new and fast ships constructed to compete with the larger and faster vessels being built abroad, the mer-

chant marine appears likely to fall back into its former position of desuetude, where it was neither a commercial asset of importance nor a factor of any great value in the national defense.

GREAT BRITAIN

The Navy Estimates

The Engineer, 18 March.—In spite of a marked increase in the votes for new construction and the Fleet Air Arm, and the provision made for extra charges, amounting to nearly £1,000,000, arising from causes beyond the control of the Admiralty, the Navy Estimates for 1927 are £100,000 less than those for the current financial year, which stand at £58,100,000. But, as the First Lord acknowledges in his statement, even this small saving would not have been possible but for the circumstance that progress on new ships was retarded by the dearth of material owing to the coal stoppage. The gross reduction in expenditure as compared with this year totals £1,795,000, the largest economies having been made under Sections I and II (Personnel and Matériel) of the shipbuilding vote, and in the votes for victualing and clothing, works, naval armaments, educational services, and miscellaneous effective services. This saving, however, is overbalanced by the increased provision for contract shipbuilding and non-effective services. It is easy to lecture the Admiralty on the need of retrenchment, but as long as the Navy is maintained at the existing standard of strength which is rightly deemed to be the minimum consistent with reasonable security, there is, we fear, no hope of any substantial reduction in the yearly bill. After all, it is consoling to reflect that in 1927 we shall be spending on naval armaments £7,000,000 less than the United States, where, oddly enough, there is a great deal of talk about the "orgy of expenditure on war preparations" in which benighted Europe is supposed to be engaged. Before turning to the detailed Estimates, certain interesting points raised in the First Lord's statement may be briefly considered. Important changes in the distribution of the Fleet are contemplated for 1927. The *Nelson* and *Rodney* on passing into service are to join the Atlantic Fleet, which will further comprise the four "Iron Dukes" and three battle-cruisers. At the same time four or five ships of the *Queen Elizabeth* class and four or five of the *Royal Sovereign* class will be attached to the Mediterranean Fleet, which will thus have a contingent strength of ten 15-inch gun battleships, as against its present quota of six of these vessels. On the China station the five cruisers at present serving there—two *Raleighs,* two "D" and one "C" class—are to be relieved by the five cruisers of the *Kent* class, now completing. The future squadron, composed of these powerful 10,000-ton ships, with a uniform speed of 31½ knots and a main armament of eight 8-inch guns, will worthily represent our interests in the Far East, while the older vessels which they relieve will provide a much-needed reinforcement for the depleted cruiser divisions of the Mediterranean and Atlantic Fleets.

The program of new construction for 1927 embraces the following ships:—One "A" cruiser, two "B" cruisers, one flotilla leader, eight destroyers, six submarines, and two minesweepers. With the exception of two "B" cruisers, which are to be built in H.M. Dockyards, the contracts for all the foregoing vessels will be placed with private firms. No news could be more welcome to our sorely tried shipbuilding industry. While there is, no doubt, a bare possibility that the execution of this program may be affected by the outcome of the naval conference to be held at Geneva in the summer, we think it more than probable that all the ships enumerated will be built according to plan. It is interesting to observe the revival of the flotilla leader, a type which has been in abeyance since the war, though its utility has been amply demonstrated. The four motor launches—presumably C.M.B.'s—originally projected for 1927, have been canceled, and in their place two vessels combining the functions of minesweepers and sloops are to be built. These units have been designed to fulfill economically the many important fleet duties for which small ships are required, particularly on foreign stations. Of the three cruisers, one will be of 10,000 tons and the others of 8,000 tons. It is announced that the minelayer *Adventure,* which is equipped with a Diesel cruising installation, has satisfactorily completed her steam trials and will pass into service shortly. The destroyers *Amazon* and *Ambuscade,* of experimental design, were de-

layed in their steam trials by the occurrence of defects in the main turbines, but the trials have since been resumed. In this connection we note with satisfaction that both vessels have now passed the contract speed in their trials on the Clyde. A fairly large program of reconstruction is in hand. The *Queen Elizabeth* is receiving bulges, the *Centurion* is being converted into a target ship to replace the *Agamemnon*, the *Resolution* is being re-tubed, and the conversion of the *Courageous* and *Glorious* into aircraft carriers is proceeding. The estimated total cost of rebuilding the *Courageous* is no less than £2,025,800, a truly formidable figure. Further heavy items for refits are £629,039 for the *Queen Elizabeth*, £358,088 for the *Centurion*, £276,591 for the *Resolution*, £104,936, £109,088, £109,197, and £118,365, respectively, for the small cruisers *Caradoc*, *Ceres*, *Cleopatra* and *Constance*, the two last-named ships being twelve years old; £46,242 and £50,208 for the sloops *Cornflower* and *Verbena;* and £104,847 for the repair ship *Assistance*, which was launched twenty-seven years ago. It is to be hoped that the expenditure of such large sums on ships no longer in their prime is justified. Turning to new construction, we note that the *Nelson* and *Rodney* are due for completion in the financial year 1927. In both cases the estimated cost has been exceeded, though not by a great margin. The *Nelson*, built by Sir W. G. Armstrong-Whitworth and Co., Ltd., represents a total outlay of £6,483,879, inclusive of guns; for the *Rodney*, built by Cammell, Laird and Co., Ltd., the corresponding figure is £6,566,884. The tabulated details of these ships show them to have an unusually large fuel capacity, viz., 4,000 tons. This exceeds the oil stowage of the *Queen Elizabeth* by 600 tons, and is equal to the maximum capacity of the *Hood*, a ship of greater displacement and more than thrice the horse-power of the *Nelson* class. It is evident that the *Nelson*, with bunkers full and other supplies on board, will displace nearly 40,000 tons, or 5,000 tons more than the "standard" figure. The armament of this class is already known, as, indeed, are all essential particulars of the two ships. On the other hand, certain details of the new cruisers are now released for the first time. The five ships of the *Kent* class have been built to the same design, the characteristics of which are as follows: Length, 590 ft.; breadth, 68 ft. 4 in.; mean draught at the standard displacement of 10,000 tons, 16 ft. 3 in. The machinery develops 80,000 horsepower, with corresponding speed of 31½ knots in smooth water and in light condition. The total oil fuel capacity is 3,400 tons, exceeding that of our largest cruisers now in service—the *Raleighs*—by 1,250 tons. Thanks to this great increase in fuel stowage, the new ships should have a very wide radius of action, which accords with their primary function of commerce protection. The main battery of eight 8-inch guns is supplemented by four 4-inch A.A. and four 3-pounder guns, with eight 2-pounder pom-poms. Details of the four *Londons* and the three "B" class 8,000-ton cruisers now building or on order are not yet available. Our first post-war submarine, the *X 1*, having concluded her trials and joined the First Flotilla, is not listed in the new estimates, but the second boat, the *Oberon*, is still a charge on the naval budget. The estimated total expenditure on this vessel, excluding armament and ordnance stores, is £596,605, an amount that should give pause to those who argue that submarines constitute the most economical form of naval defense. Twenty-four additional submarines are projected for the ensuing three years, and six have been already ordered. The four gunboats for service in China have been delayed by the coal dispute, but the initial shipments of material to Hong Kong, where the vessels are to be assembled, have begun. They are ships of 262 to 310 tons, with speeds of 14 to 16 knots, armed with two 3-inch guns. No details, financial or otherwise, of the submarine depot ship *Medway* or the repair ship *Resource*, both recently ordered from Vickers, Ltd., are contained in the estimates. The floating dock No. IX., under construction by Swan, Hunter and Wigham Richardson for the Singapore base, is expected to absorb £374,719 up to the end of the coming financial year. The total cost of this structure is unofficially estimated at £1,200,000.

Provision is made in 1927 for a naval personnel of 102,275, which is 400 less than the existing establishment. It would have been necessary to increase the total but for the delay in completing new ships. Apart from the expansion of the Fleet Air Arm, reflected in the larger votes both in the Navy and the Air estimates, there is evi-

dence of the special attention which naval aviation is now receiving. Ninety-five naval and marine officers have qualified as pilots, and twenty-eight more are under training. Furthermore, fifty-eight naval officers have been trained as observers. Besides these qualified ranks a number of junior executive officers have gone through short training courses in the aircraft carriers attached to the Fleet, and a Committee has now been appointed to consider the whole question of instructing junior officers of the Navy in air work. Of the officers already on air service the First Lord writes: "A very high standard has been reached in the execution of their flying duties with the Fleet, and has assisted very materially in the progress made in the use of aircraft at sea." Distinct progress is recorded in general fleet training, gunnery, torpedo, anti-submarine, and anti-mine exercises. That the Navy is not unmindful of the air menace is made clear by the augmented high-angle batteries of new ships, and by the First Lord's confident assurance that "we shall shortly be in a position to say that the A.A. defense of the Fleet has become a formidable obstacle to every form of air attack on surface ships."

FRANCE

On Limitation of Armament

Journal de la Marine—Le Yacht, 19 February.—*The Yacht* was right in its recent article, in foreseeing a new naval conference for the purpose of fixing the number of units in the classes not provided for in the Agreements of Washington. The proposition came even sooner than expected.

On this question the position of France has been decided for some time. Ever since the Society of Nations has been in existence, the successive French governments have declared that such discussions should include, at the same time, land, naval and air armament. The matter has been brought to the attention of the Society of Nations; the latter has been working on it for more than a year and the United States has collaborated in these studies, which have not yet gone beyond the preliminary stages. Unless there be a desire to ruin the prestige of the Assembly meeting at Geneva, we must leave to its committees the task of preparing a universal agreement, both as to the number of contracting parties and the subjects to be treated.

In this article, however, we shall consider the question only from the naval, and particularly from the French, viewpoint.

It is not probable that the French navy should be aimed at in the proposition of the President of the United States. The text of the communication itself, addressed to the various governments, shows it most clearly. It states that, so far as it is concerned, the United States would accept, for cruisers, torpedo boats and submarines, the proportion of 5-5-3 accepted by them, by Great Britain and Japan for ships of the line and airship carriers. As to France and Italy, special negotiations would fix their respective percentages, with due consideration of the situation of the two countries and their necessities. This wording certainly indicates that the American government has realized the strong reaction that a further effort at the limitation of our navy would produce in French opinion.

Accordingly, the existence of French cruisers, torpedo boats and submarines can be only of a relative interest to Americans, whether or not they have any sympathy for our country.

On the other hand, it is perfectly clear why the United States—after imposing on Japan a narrow limitation for the number of its ships of the line, and at the same time the destruction of some of them that had not yet been finished—should desire to complete the work in such a manner as to prevent the Japanese from making up, as they have begun to do, for their inferiority in battleships, by developing their fleet of light units.

As matters stand at present, the statistics published by this periodical show the superiority of the squadrons and flotillas of Japanese cruisers over those of the United States. But that is a quarrel in which we have no reason to participate, because it does not concern us in any manner.

It is equally indifferent to us whether the British fleet is or is not equal to the American, either in light or heavy craft. It is, likewise, perfectly plain why the English, whose very life depends on the security of its ocean routes in war time, should hesitate before accepting that principle of equality. But, here, again, we are simply spectators. We recognize the right of both the United States and Great Britain to

create the engines necessary for their security; all we ask is that the same rights be granted us.

But the Washington Conference, five years ago, refused us that right. It is really in a most arbitrary fashion that the representatives of the three great naval powers, the United States, Great Britain and Japan, and particularly the first two, decided that the French fleet should, in proportion to their fleets, remain in the ratio of 1.75 to 5. No reason, other than the pleasure of the parties concerned, justified that decision. In making that decision, it was claimed that it was based on facts such as they were found, without desiring to take into account the fact that that situation was due to the sacrifices we made during the war by using all the resources of our navy yards, both public and private, to provide arms for our armies and those of our allies. During that time, the United States, Great Britain and even Italy constructed many ships and changed profoundly the maritime situation that had existed before the war. There was no desire to base the calculations of the number of units we need for the extent of our coast either on the importance—vital as it is—of our maritime communications or on the extent of our colonial empire dispersed in the four corners of the world, with our navy as its only protection. In the face of a campaign of intimidation and even of calumny—to use the proper word—which was conducted with great skill, our representatives had to yield, but only so far as concerns ships of the line. They, furthermore, thought that that concession would be compensated in some fashion, and that it might not have all the importance that it appeared to have; for at that time, many a sailor was tempted to believe that the era of the battleship had closed and that, after all, we maintained the liberty to rebuild our navy if we preserved the right to build as many light units and submarines as we deemed indispensable for our interests.

There is one point on which the violence done us was particularly unjustifiable. That was the equality imposed in principle between our fleet and that of Italy. The latter has no distant colonies; all its material interests are concentrated in the Mediterranean. Ours, on the other hand, are exceedingly dispersed, and, even if we consider only European waters, it is impossible for us not to keep a number of ships in the English Channel and in the Ocean; hence, that if our total navy were equal to that of our Italian neighbors, we should be notably inferior to them in the Mediterranean.

The naval program worked out in 1922 and the execution of which has been continued since, in conformity with the laws fixing each year the units to be built, was not, furthermore, intended to reëstablish, with any degree of accuracy, the margin of security that the most elementary prudence would oblige us to maintain, even in the face of a friendly nation. It was based entirely on defensive considerations that take into account elements which the Washington Conference systematically neglected, namely the immediate protection of our weakest points along the coast and of our maritime routes on which depend both our mobilization and supplies. There is no question of comparison with anybody, but of material calculation, so to speak, that escape the minds of foreigners.

It is well known that the totals at which we aim, and which are specified in the Act establishing program, are 390,000 tons for light surface ships (cruisers, torpedo boats and destroyers), and 90,000 tons for submarines.

The question of ships of the line has been reserved, so that we have not laid the keel of any battleship to replace the *France*, lost in 1922 in the Quiberon Pass; nor do we avail ourselves of the right accorded us by the Treaty of Washington, to build in 1927, another battleship intended to replace the oldest of our dreadnaughts. However, with regard to light ships, the assertion of our right has been emphasized by construction which nobody can sincerely fear, and which, furthermore, will not give us, for a dozen of years, the minimum navy which we declared necessary.

We find it perfectly natural that Italy, like the other maritime nations, should be inspired by similar considerations; how can we help insisting on it for ourselves? How can we consent that nations such as America and Japan, who have no rôle whatever to play in the Mediterranean or in the English Channel, should fix the number of units we have a right to maintain?

In truth, the very principle of a Conference for the limitation of naval armament, such as there is an effort to force upon us

again, is untenable. The studies of the Society of Nations, conducted with prudence, must lead gradually to a general reduction of armament which, be it noticed, is already far less extensive than before the war. However, if it is desired that that end be attained without the sacrifice of the major interests of any country and without inflicting on anybody's *amour-propre* one of those wounds that are often worse than material damage, we must abide by that procedure. Its slowness is compensated by its sureness. Any agreement in which some powers would again be victims of the desire for hegemony on the part of others is undesirable from any point of view. That is why we must stand by the minimum program we have adopted and which we have begun to execute. To act otherwise would be to compromise, perhaps beyond remedy, our position in the world.

French Postal Aviation

From the French Press.—For several years negotiations have been under way between France and the Republics of Brazil, Uruguay and Argentina, with the view to establish and operate an air mail service, with the double object of establishing such postal communication between South America and France—and naturally Europe—via Buenos Aires, Montevideo, Rio Janeiro, Pernambuco, Cape Verde Islands, Dakar, Casa Blanca, Toulouse, and of establishing rapid connections between the coast cities of South America, which are served only by the steamers plying between Pernambuco and Buenos Aires, a distance of 4,000 kilometers, representing, for instance, the distance between Paris and Bagdad.

It will be remembered that a French mission undertook, in 1925, a Rio-Buenos Aires as well as a Rio-Pernambuco round trip for the purpose of study. It is also known that a Convention which was before the Council of State of Brazil for months, pending ratification, was signed by the government of Brazil last year.

Recent telegrams sent by Mr. Gaston Doumergue, President of the French Republic, to the presidents of the Republics of Brazil and Argentina, gave hope that the negotiations were progressing favorably.

These negotiations have come to an end. The agreement is complete between the Republics of Brazil and Argentina, on the one hand, and the French Republic on the other.

Nothwithstanding efforts made recently by other countries who entertained strong hopes of supplanting French aviation, the latter, thanks to its past, to its aviators, to its equipment and the regularity of the service on its senior line, Toulouse-Casa Blanca, extended since last year to Dakar, has been chosen as being the more competent to organize the immense artery of 12,500 kilometers between Toulouse and Buenos Aires.

A telegram from Buenos Aires announces that the half sea and half air service will be inaugurated on September 1, next.

The agreement stipulates that the trip is to be made at the beginning in seven and a half days, and that the time is to be reduced, gradually, to four days.

Articles of mail will be transported by rapid airship relays between Toulouse and the Cape Verde Islands, whence they will be sent to the Island of Fernando Noronha, and thence, by air, to Buenos Aires.

It is to be added that the French maritime aviation service intends to make, this year, a Berre-Buenos Aires trip, to be effected by a marine crew with a double motor Goliath, especially equipped for this trans-oceanic air voyage.

JAPAN

Five, Three or Two

Japan Advertiser, 4 March.—Domestic politics intervened for twenty-four hours between the Japanese press and the naval limitation question, but as soon as they had said their say about the coalition our vernacular contemporaries turned with keen interest to the American proposal and the possible effects of the British reply. Comment is still speculative and must necessarily be so, for the question is "mutsukashi" in a high degree. But if the reaction of public opinion in Japan now is compared with that at the time of the Washington Conference, a marked difference can be observed. There was then both natural alarm at a novel and unexpected move and much skepticism as to the practicability of limitation. It hardly seemed possible then that so delicate a matter as the regulation of national defense forces could be arranged as a fair and unoppresive bargain without open or concealed dictation. But it was so

arranged, the results have been excellent, and we see the effect today. Public opinion supports the idea of limitation by agreement and understands the broad elements of the problem.

The phase of the question which events have brought to the front is whether if a five-Power conference fails a three-Power conference can attain results. The Osaka *Asahi* thinks it can. The Tokyo *Nichi Nichi* believes that French objections to the present ratio will make the success of a full conference doubtful, and observes that if England is endowed with "keen insight and strong conviction the calling of a three-Power conference is possible." The meaning of the remark seems to be that if Great Britain will accept the risks of leaving France a free hand in submarines, Japan and the United States can join with England in a program of limitation. That is another six-sided question, not easy for any British government to answer. The risk might be worth taking. The question cannot be settled on naval grounds alone. The whole European situation and indeed the world situation would have to be examined. The United States administration would have to consider whether it was prepared to invite the British empire to incur risks which might prove extremely serious. If a three-Power conference met and failed, the cause of limitation would suffer. Competitive building might begin and conditions would rapidly become worse.

The Jiji saw the force of such objections and suggested that President Coolidge would use the British and Japanese acceptances as a fresh argument to persuade France and Italy to reconsider their attitude. Our telegrams from Washington this morning report that he is doing so. We can but hope that his efforts will be successful.

There is a third alternative which has not yet been mentioned. If a five-Power Conference and a three-Power conference are alike impossible, is a two-Power arrangement between Japan and the United States entirely out of the question? Those two countries are remote from Europe, politically as well as geographically. No European fleet now in existence or likely to be in existence in the next decade can menace their security. No political question exists between them and European Powers which is at all likely to cause a grave dispute. The navies that interest them chiefly are each other's. If they enter on competitive shipbuilding it will be against each other. Is it impracticable for Japan and America to seek an understanding which would enable them mutually, to enjoy the advantages of limitation? We ask the question without any intention of implying an answer. Singapore enters into it, of course, and may constitute as grave an obstacle to a two-Power agreement as the French attitude offers to a three-Power agreement. But limitation is so desirable an end that every avenue ought to be thoroughly explored. Remote risks should not outweigh tangible advantages.

In one important aspect the present movement differs from that of 1922. The Washington Conference aimed at and secured a large reduction in existing fleets. This was made possible by America's readiness to scrap battleships—a lead to which Japan promptly responded. The essential object at present is not reduction, as President Coolidge has been at pains to point out, but the prevention of increase and elimination of the risk of competition in naval building. For this reason an agreement which did no more than stabilize the status quo would be worth achieving. It would do little to relieve the excessive cost of present armaments, but it would prepare the way for great economies later as confidence increased. There are good reasons for going slowly just now. Some eminent naval experts hold that new construction at present is sheer waste. Aircraft, they say, are rendering fighting ships obsolete. Even the most convinced adherent of the "blue water school" of defense might be shown good reason for calling a halt to expenditure. And in this matter of limiting armament burdens, every little helps. Peace will only be won as the war was won—"little by little and bit by bit."

Naval Equality With U.S.

Japan Advertiser, 1 March.—Japan must stand on a perfectly equal footing with the United States. The ratio of naval strength should be 5-5, otherwise Japan is urged to quit the proposed limitation parley. We do not see why Japan has been compelled to retain only three capital ships as against five of the United States navy. It is insisted, in a certain quarter, that the number

of merchantmen and the volume of foreign trade must be duly considered, but these are not permanent. They are subject to change and are not influenced by ratio, while the development of national fortunes is by no means parallel. It is absurd to define a ratio on the basis of strength liable to change. If such absurdity be allowed to prevail, Japan will be compelled to protect 100 merchant vessels with only three warships. This is impracticable, so we resolutely maintain that such a dangerous plan should be rejected.

If the extent of coasts be a standard for a ratio, Great Britain, alone, will stand at the coign of vantage. Proud Americans say haughtily, "Little Japan! three ships are too many for you!" It is stupid to meet such proud fools in conference to discuss peace. The principle of racial equality is not visionary. It is as real and earnest as national equality. If the definition of military strength, duty and right by an international treaty be a feasible proposal, Japan should be entitled to maintain five war ships against the same number of the United States. Otherwise Japan should not allow herself to participate in the arms limitation movement.

The American House of Representatives has altered the first plan for ship construction and has carried a resolution for the payment of $450,000 so that three light cruisers may be started. This is an insignificant sum of money for a nation which takes undue pride in wealth. The decision is contradictory to the principle for which America proposed the calling of an arms limitation conference. This is an impertinent attitude of the United States.

GERMANY

German Air Lines

Revue Maritime.—The franchise for the operation of the London-Amsterdam Line has been awarded to the Germans by the Imperial Airways.

This service will hereafter be operated by the Lufthansa, which can more easily pay the expenses by reason, of the high subsidies received by the company. Since the end of October, German high power machines have been flying every day over England, thus proving that Germany has definitely resumed its place among the great powers in commercial aviation.

The length of the lines operated increased from 3,400 kilometers in 1923, to 13,000 kilometers in 1925. One-third of these lines serves Berlin; more than one-half of the mileage (53.5 per cent) belongs to domestic service. It is one of the peculiarities of German commercial aviation that, contrary to the practice of other countries, the development of the domestic lines has received a greater impulse than that of the international, though the latter offers more business and higher compensation. This difference is, no doubt, due to the difference in organization, which, in most countries, is dependent mostly or exclusively on the government for the financial support of the companies, while in Germany, the latter have found at least an equal support among the economic groups of cities. It is, furthermore, well known that, in France, several Chambers of Commerce, have recently indicated their desire to enter upon such enterprise, and the Committee for Aëronautic Propaganda is trying to develop this movement.

The results of the traffic have been most satisfactory. From 84.8 per cent in 1924, the coefficient of safety has risen to 89.9 per cent in 1925. The passenger traffic increased from two million passenger kilometers in 1923, to 10.6 million in 1925. The number of persons transported increased from 13,422 to 55,185. The foreign traffic, which exceeded the domestic traffic in 1924, has fallen below it in 1925. The reason for this change is easy to grasp. It is in 1925, the year of the definitive monetary reëstablishment, that the municipalities engaged resolutely in the course of subsidizing aviation, a course in which they had taken but a few steps in 1924. It is also during this year that the competition between the two great rival aëronautical groups (merged into one at the beginning of 1926) the *Deutsche Aero Lloyd* and the *Junkers Luftverkehr,* past through an acute stage; each of these factors tended to produce a considerable effect on the domestic development, which many people, even in Germany, consider excessive and hardly justified from the mere economic point of view.

The freight traffic has been increasing satisfactorily (though the progress is less marked than in passenger traffic) particularly in the transportation of mail and newspapers.

It is to be noticed, however, that the cargoes have been below the useful maximum. That is the best proof that the development of the German air lines is at present out of proportion with the needs of the traffic.

The Junkers Company, which is under contract to maintain air communications between Persia and Europe, intends to open an air line which, passing through Russia, will connect with the German system. The service will then be extended to Bushire, on the Persian Gulf, and as far as the frontier or Irak.

The Persian government has entered upon negotiations with the Junkers Company for the establishment of a Bagdad-Bakou Line, in the Caucasus, and thence to Moscow, Berlin, Paris and London.

Neutralizing and Somniferous Gases

Revista General de Marina, January, 1927.—In the vicinity of Halle, there is a factory of chemical products which, according to the German technical press, devotes itself to the investigation of new gases to be applied in war, and which has recently discovered a gas which has the property of destroying and neutralizing the deleterious effects of those heretofore employed. This factory is aiming to produce this neutralizing gas on a large scale, with the view to make its action of practical value on battle fields.

Tests have likewise been made with other gas, very volatile and almost invisible, which produces somniferous effects for a period of five hours. An attacking army using them will thus be enabled, not only to reduce the enemy's resistance to nothing, but to conduct the assault without the necessity of making the soldiers put that annoying mask on when the gas is sent forth.

The use of these gases would be perfectly legal, as they do not produce any toxic effects.

ITALY

War in Arabia?

Against the Italian advance. Conversation with the Great Sheik of the Sonussi, who is with the ruler of Asir. England and Ibn Saud in the background. Trip through Southern Arabia. (Special service for the *Vossische Zeitung.)*

The danger of war in Arabia between Ibn Saud and the ruler of Asir, on the one hand, and Yemen, on the other, which has been threatening for some time, has reached a climax during the last few weeks. The situation has been made acute by the advance of Italy into Arabia, Italy having some months ago concluded a treaty of friendship with Imam Yahia. As the first representative of the press to come into this region, I have traveled through Southern Arabia and have spoken with both Said Hassan Idrisi, the ruler of Asir, and with the Great Sheik of the Senussi, who has taken refuge with the former. I have been able to ascertain that there are great war preparations in Asir.

Said Irdisi has made the following statement to me:

I declared war against Yemen and rejected the peace treaty of the Italian representative, Scenetti. I want all the coast plans of Tahama down to south of Hodeida, which are under the sway of Mohammed Idrisi. His mad follower, Ali, allowed Iman Yahia, the ruler of Yemen, to occupy Tahama in 1924. Ali has, furthermore, been dethroned, and Tahama is longing to be restored to Asir. Our peace conditions are: union of the Sunnites under the ruler of Asir, that of Shiites of the mountains under the rule of Yahia. The protector of the Federation, Ibn Saud, has issued instructions to the governor of Ebhas to prepare the necessary armed assistance. So it pleases the Lord, it will be superfluous to claim the traditional friendship of England, as Yemen is completely surrounded by other closely allied neighbors.

The policy of Asir in Yemen is strongly influenced by the Grand Senussi, who has taken refuge in Asir, who is an enemy of Italy and who was the religious teacher of Hassan Irdisi, and passes for a "holy man." Your representative has had the opportunity, likewise, to interview the Grand Senussi, who made the following statement:

My nephew, Sidi Rida, who is my representative, commands the Senussi Order and is fighting on at Benghasi, in accordance with my instructions. The Italians will pay dearly for the occupation of Charabub and the profanation of this sacred cultural center of the Order of Senussi. My family and I would much rather have our throats cut than live under the rule of Italy. Italy proposed peace and desired only to establish a protectorate over this region. I offered economic concessions, but asked in return complete evacuation of coast cities, including Tripolitan cities, warning them that, otherwise, war must be eternal.

The crisis in interior Arabia was made more acute by interference on the part of England. England tried to conclude a treaty with Imam Yahia of Yemen. The negotiations, however, stranded on the de-

mands of Imam. He rejected the treaty proposals of England and demanded, among other things, a free hand in concluding treaties with the European powers, also a great part of the protectorate of Aden, and finally, a Yemen garrison in Aden itself. In return, he offered England a railroad concession. Thereupon, England broke off negotiations, while Mussolini availed himself of this opportunity, recognized Imam Yahia as king and concluded a treaty with him. The treaty provides for considerable assistance from Italy, which assistance has begun to come forth. At Hodeida, I spoke to two radio officers attached to the Italian military mission of that place, which has followed the diplomatic mission. In addition, there are physicians, officers, flying material and war materials on the way from Italy to Yemen.

England was hiding behind Asir. Said Idrisi granted an English Oil Company, recommended by the Foreign Office, a valuable concession on Farsan Island, where initial tests have given satisfactory results at the beginning of the month (December). The oil company paid the amount of £13,000, sterling, and is delivering war materials to Asir. The company further extended a private loan, which is covered by oil shares and enables the government of Asir to effect a mobilization, not only in Asir, but also among neighboring tribes.

I have had the opportunity to ascertain the temper of the neighboring tribes. I went in my own sail boat along the coast of Arabia from Hodeida to Jiddah. The Bedouins are everywhere in warlike disposition, they hate Yahia and are only awaiting results in Asir to join in an uprising.

Significant of the temper of south Arabia is the fact that I was arrested by the Commander of Medi as an English spy, and the captain of my boat was put in chains.

The main events of the past few days centered on Ihn Saud. There a representative from Asir and the British Consul, Jordan, negotiated with the Wohabitees, with the view to secure their support against Yemen. Ibn Saud apparently declined to undertake a war of aggression against Imam Yahia, but promised his support.

Practical Training of Junior Officers

La Revue Maritime, January, 1927.—In order to pursue the practical training of ship officers, of naval engineering officers, of temporary officers in the operation of machines and of such as belong to the permanent active list of the Port Captain's service, Order No. 1784 of 16 September, 1926, empowers the Ministers of the Navy and Communication to embark—on the ships of subsidized companies, on trans-Atlantic liners and on ships operating a regular service and belonging to Italian nationals—the following junior officers: ship officers, officers in naval engineering, officers engaged from time to time in the supervision of machines, and such as are on the permanent active list of the Port Captain's service. A lieutenant or a lieutenant commander is to be in charge of such officers.

This embarkation, which is considered on the ships of the Royal Navy, as an accomplished fact, will be normally for a period of six months.

The Order provides that groups so embarked shall not exceed six men, including the officer in charge. . . . .

Officers so embarked will aid the officers aboard at sea, participating in watch service, in calculations; and, under direct command of the captain of the ship, they will take part in the maneuvers in entering and leaving ports. In the latter, they will aid officers in charge of the handling of merchandise.

The naval engineers and the officers engaged in operating machines will aid in all machinery service and will be present whenever machines are repaired, taken apart or set up in the ports, if the chief engineer on board should deem it useful for their instruction.

The officers of the Port Captain's service will take part in watch service with the navigation officers on board; they will take part in astronomical observations and the graphical solution of the problems, as well as in the maneuvers in entering and leaving ports; they will aid the officers charged with the loading and unloading, and, so far as possible, will study the organization and traffic of the ports by making notes and gathering documents.

The chief of these instruction groups, in accord with the captain of the ship, will make regulations for the service and will grant leave in foreign ports whenever it is deemed useful for the instruction of the officers embarked.

Such officers will receive, in addition to the salary of the merchant marine officers embarked on the same ship, a special allowance of sixteen lire per diem for the chief of the group and fourteen lire for the other officers.

ENGINEERING

Better Ships for Less Money

By REAR-ADMIRAL GEORGE H. ROCK,[1] *(CC), U.S.N.*, WASHINGTON, D.C.

Mechanical Engineering, April, 1927.—The present general movement toward standardization in industry is the natural result of the forces which gradually and for a long time have been building up in that direction, although the first national organization of prominence with which I am familiar is the British Engineering Standard Association, instituted in 1901.

Every engineer who has handled large contracts which included projects having similar features has experienced the desire and felt the necessity of simplifying and standardizing in order to save time and cost and to insure a better product. Twenty-eight years ago in the Superintending Constructor's Office in which I was an assistant, in a large shipyard where several war vessels were under construction and a fairly continuous building program was expected, there was prepared a large bound volume, called "Standards," consisting of some two or three hundred sheets of fittings of all kinds entering into the construction of the vessels. These standards were specified by their symbols on the various working plans as they were developed for the different ships, and thus not only saved time in the preparation of plans and the fabrication of the fittings, but also insured the installation of a standard fitting wherever it was applicable. This, of course, was mandatory only in that one yard, but the data were used to some extent in other shipyards.

Similarly, in the same office, the filing of correspondence became so involved that necessity forced the working out of a subject filing system, intended to be applicable, and which it was hoped would be adopted, for all similar offices. The point intended to be brought out here is that the underlying idea was to simplify the procedure and to standardize the methods to save time and to promote accuracy and uniformity. These two incidents are cited only to illustrate the inference intended to be drawn from the earlier statement that isolated efforts toward standardization were being made in many places, but there was not much encouragement in the nature of a general acceptance or adoption by others.

Many branches of industry drift along aimlessly with an enormous quantity of spare parts and an excessive diversity of sizes and patterns for the same design for every-day pieces of apparatus. This means a vast amount of stock accumulated and turned over very slowly, with high costs of production. This was exemplified by an experience of mine in one of our large navy yards about seventeen years ago, occasioned by the condition of the storehouses in which there was a very large accumulation of stock or fittings of all kinds, a large proportion of which had been turned in by various ships going out of commission or undergoing extensive overhauling over a period of several years. Due to lack of space or foresight, or bad management in some part of the organization, these fittings had not been kept segregated and they were in such quantities and in such a multitude of sizes and designs that it was the general practice, because it was considered cheaper and it certainly was much less trouble, to make a new fitting than to search out a suitable one in store.

An unused building was selected and hundreds of loads of these fittings were hauled to it, where they were sorted and stowed in suitable bins and on racks, shelves, etc., so labeled that any article could be found immediately. Complete lists with free-hand sketches where required were prepared for the use of draftsmen and foremen, and no corresponding articles were made or purchased thereafter where a substitute could be obtained from the collection. All this took much time of officers and employees who were needed elsewhere, and cost a large amount; but it was necessary to overcome the congestion caused primarily by the absence of standard requirements, and the lesson impressed on those who were handling the work was the necessity of standardizing the different items purchased or manufactured.

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Address delivered on October 26, 1926, at a meeting of the Washington Section of the A.S.M.E. held during Management Week.

By inviting a naval constructor to speak on the subject of simplification and standardization it is presumed that the program committee considered that the subject as applied to the work of construction in the Navy would be of general interest to others. This should be so, for in many ways the Navy has either a direct or indirect interest in every phase of the question. We are interested in nearly every material of engineering, for nearly all are used either on warships or in the navy yards and stations. Naval officers regard the question from the viewpoint of designer, manufacturer, storekeeper, distributor, and consumer. All these must be coördinated and directed toward one end, the efficiency of the fleet. In our work on standardization and simplification we act from no selfish motive and we have no ax to grind; our efforts all being directed toward increased efficiency and economy.

The Various Kinds of Standards Used or Usable in Shipbuilding

Preliminary to a general discussion let us classify as follows the various kinds of standards which are or may be used in the building of ships:

I—Standardization of Interchangeable Articles Purchased or Made in Quantity. Articles purchased are such as lenses for air ports and dead lights, pipe fittings, hose, galley equipment, hospital equipment, plumbing fixtures, articles of outfit, etc. Articles made in quantity by the shipyard or by the Navy Yard are small boats, doors, manholes, airports, blocks, etc.

II—Standardization of Quality. This type of standardization is exemplified by specifications, such as those for structural steel, rivets, lumber, and practically every other material entering into the completed ship.

III—Standardization of Design and Workmanship. Such standardization is illustrated by type plans of installations, general specifications, and the rules of classification societies and other associations such as the Fire Underwriters. For naval vessels the General Specifications, together with all of the supplements forming part of these specifications, give complete instructions for the workmanship and general design requirements of the entire ship.

Taking up these three classes in order:

Standardization of Interchangeable Articles Purchased or Made in Quantity

Standardization of the type of articles listed in the first class above must be recognized as setting distinct limitations on further progress. When such standards are once set and are widely used it is almost impossible to change them, even though they are later proved to be defective or obsolescent. Before such standards are adopted this disadvantage should be weighed against the obvious advantages of increased economy, convenience in replacement, uniformity of design, etc. A ship is probably less susceptible to standardization of this character than most other products of industry, because the ship is essentially a built rather than a manufactured product. Moreover, many of the articles on a ship falling within this class exist in such limited numbers that they are not carried in stock by any ship chandler. Take, for instance, watertight doors. It is necessary to have numerous types and sizes of these doors to meet the different conditions of access and pressure called for in different parts of ships of different types. Such doors when once made usually last for the life of the ship. The principal expense connected with making these doors is the cost of the materials and the cost of labor. The advantages of universal standardization are quite questionable for an article of this kind, although standards adopted by each great shipbuilding organization, such as the Navy, are found advantageous. Other articles in the first class are more susceptible to standardization. For example, lenses can be standardized in dimensions, the number of different sizes being greatly reduced. Small boats are built in quantities in certain yards, standard working plans for each size being subject to change only in the Navy Department and are modified there only when tried out improvements are added. The number of different sizes is gradually being reduced. Only recently the 35-ft. and 50-ft. motor boats were discontinued, the 40-ft. motor boat being considered sufficient to answer all purposes, and it will gradually replace the others as they disappear. Standardizing the boats means standardizing also the handling and stowage gear and appliances.

The work of standardizing hull fittings and items of equipment is going ahead as

rapidly as conservative engineering practice and the availability of competent personnel will permit. A thorough understanding of the limitations is necessary if satisfactory results are to be expected. The work thus far has proceeded along conservative lines and, through the agency of the American Marine Standards Committee, the advantages of the standardization and simplification of ship fittings and equipment are being extended to American merchant ships. Important progress is being made.

Standardization of Quality

In regard to the standardization of quality, Class II above, it is essential for a Government establishment such as the Navy to adopt this type of standardization, as the law requires that all purchases made by such an establishment shall be by competitive bidding. Entirely aside from this requirement, however, the standardization of quality of articles purchased is of the greatest benefit both to the user and to the manufacturer. It establishes a uniformity which all manufacturers desiring the business must meet, and therefore makes it difficult for unscrupulous manufacturers to compete successfully by selling goods of inferior quality. Standardizations of this kind should not be considered as permanently fixed. They should be constantly changed to meet the changes in manufacturing procedure and in the requirements of the users. There can be no doubt that standardization of this kind operates to reduce the cost of materials, as well as protect the reputable manufacturers.

This particular phase of standardization has been given special study for a number of years. Some ten years ago this work was put on a going basis by the adoption of standard stocks of certain materials. The standard stock lists prescribe the types, sizes, and quantities which should be carried in stock at various naval stations. It might be remarked in passing that to keep this standard stock list up to date and worth while requires eternal vigilance and means a labor of love on the part of many who are so constituted that they can keep plodding at a job which is of the kind that is never finished. The quality of materials purchased by the Navy is described in Leaflet Specifications, a system of long standing. These leaflets are being worked on constantly to keep them abreast of the times, with due regard for the progress of engineering practice and, of course, the national program of simplification and standardization. They are sometimes criticized as being too severe; but it has been necessary to make them severe to insure getting materials that will stand up under service use. It is well to remember that ships are built to last many years, to stand storm and stress at sea, and even to withstand punishment in battle. The Navy also uses many materials which fall in a different category: materials which well can be of the best regular commercial grade or standard. The Navy is avoiding, wherever practicable, the use of special material and is in favor of the adoption of commercial standards now recognized. As an illustration of progress along this line, we have recently revised one specification for wrenches and have eliminated forty-nine different types and sizes, a reduction of about 36 per cent. This is simplification and is good business. Also we have given up our special-dimensioned anchor cables and have adopted and are gradually installing cast-steel chain of commercial dimensions together with the new wildcats required on the anchor windlasses. In this work we often encounter difficulties due to the fact that manufacturers of many materials have no trade standards, even as to size. In other materials we find a multiplicity of standards. There are still others which have passed under the magic wand of standardization, but to no purpose. Unfortunately, there are many standard specifications which have been set up by the trade or by standardization agencies which are not satisfactory from an engineering standpoint and which are not suitable for general use.

An illustration of the difficulties in formulating standard rules is the case of boiler testing in Great Britain, where during the last thirty years three separate committees were appointed by the Institution of Civil Engineers to draft a set of rules. The first one, appointed in 1897, made its report in 1902. The second committee, appointed to bring the first report up to date, ran from 1909 to 1913. Their work did not command the respect of many engineers, who simply ignored it because they considered it impractical. The third committee was appointed in 1924.

Inasmuch as simplification and standardization are not new considerations for the Navy, we are taking active part in the work.

We lead as well as follow. Our technical forces are engaged in many problems in connection with the Federal Specifications Board, the American Engineering Standards Committee, the American Society for Testing Materials, the American Marine Standards Committee, and the Division of Simplified practice. It is hoped that our participation may be increased rather than diminished.

Standardization of Design and Workmanship

The art of shipbuilding has probably brought the last type of standardization listed above to a higher state of development than has any other industry. For merchant ships, the requirements of such classification societies as Lloyd's and the American Bureau of Shipping are given in such detail for the various types of vessels that the designer must meet definite design standards in order to secure the classification desired. This type of classification of standardization of types of ships serves principally to protect the underwriter, although it also protects the owner and assists the designer. The rules of the classification societies, although definite, are, in general, not hard and fast; they are subject to change to meet developments in shipbuilding and in ship operating.

Lloyd's dates from 1688 (Hammersley says 1601) and is an association of merchants, shipowners, underwriters, and ship and insurance brokers by whom classes and rates of vessels are established and registered. Lloyd's Register is a list of seagoing vessels of all nations, classified according to seaworthiness by the association, which maintains an inspection of hulls, engines, etc., and supervises British marine construction.

The American Shipmasters' Association was incorporated by the Act of April 22, 1862, in the state of New York, the title being changed to American Bureau of Shipping by order of the Supreme Court of the State of New York in 1898. The constitution adopted in 1922 states that to carry out the object of the charter, it is to "provide classification and registry of mercantile shipping, and to aid and develop the merchant marine of the United States of America."

Corresponding to the rules of classification societies for merchant ships, we have for naval ships the General Specifications for hull and machinery, together with their supplements. These General Specifications and supplements give complete details as to the design and workmanship requirements for naval vessels, but they permit greater latitude to the designer in developing special types. In fact, the Navy feels itself free at any time to depart from the General Specifications if these specifications are found not applicable to the requirements of new types being designed.

At present in the construction of warships we are standardized in certain characteristics by the terms of the recent Treaty for the Limitation of Naval Armaments. By these terms the maximum displacements and maximum sizes of guns in the main armaments are fixed for battleships, aircraft carriers, and cruisers.

In connection with the question of standard design of merchant ships, it will be remembered that the country was engaged in quantity production of ships during the war. Many ships were built from the same plans; some well built, many poorly built. They were built in record time and accomplished their essential mission. These ships were designed for a definite purpose, and have generally been found unsuitable for peacetime service in competitive commerce in the various lanes of ocean traffic. While they had a large effect in ending the war, and thereby represent a victory in standardization, it must be recognized that this particular application of standard design was successful only for a special set of conditions. This noteworthy instance of standardization teaches us that there are natural limitations which must be studied and not disregarded when we endeavor to undertake standardization in its broadest terms.

A recent transaction is a reminder: In August, 1925, the Government sold to Mr. Henry Ford 199 steel vessels for $1,697,470 —a return to the Government of less than one cent on the dollar.

Benefits to be Derived from Sensible Standardization in Ship Design

The benefits to be derived from sensible standardization in ship design are quite obvious. Standardization stands for economy and facility; economy in time and money; ease of procurement and assurance of suitability for the intended purpose. These advantages are especially emphatic in the case

of repair work, as a merchant ship is a financial liability except when it is under way. Interchangeability is an important asset. We want all fire hose to be of the same size and of similar threads so that it will be usable on any ship, and similarly for many other items. Further, interchangeability of personnel in the Navy and in the merchant marine is an important consideration. New personnel on one ship can very readily understand the operation of another ship if standardized equipment and methods are in vogue. This is very important in time of emergency, when the Navy might be called upon to take over and operate many merchant ships. As an example, consider the one item of the marking of pressure piping to designate whether a pipe carries live steam, exhaust steam, salt water, or compressed air. The advantage of similar markings on all ships is entirely obvious. Indeed, there are many avenues for simplification and standardization in ship design. It is highly desirable to standardize where practicable; it is essential to avoid standardizing where impracticable.

It must be well recognized, then, that the program of simplification and standardization is essentially an engineer's job. In undertaking this vast work we must accept responsibility for its outcome. We know it will be a great success of far-reaching betterment if it is worked out on a basis of engineering principles; it cannot succeed if it is worked out on the basis of expediency. For the protection of the reputation of the engineering profession, it is essential that engineers should strive to keep this movement strictly on a firm, conservative, and—above all—technical foundation. The mistakes which are made will be far-reaching and costly. We must guard against mushroom tendencies, superficial studies, and perfunctory action. The setting up of American Standards which cannot be readily accepted by manufacturers and well-informed consumers will be distinctly detrimental, and, of course, worse than no standards at all. I have faith in the work under the guardianship of the Division of Simplified Practice, the American Engineering Standards Committee, the Federal Specifications Board, the International Electro-Technical Committee, the American Marine Standards Committee, and others, but I sometimes feel that there is a tendency on the part of the personnel to rush things unduly in order to "make a showing." If my advice were requested I would say that emphasis should be placed on quality rather than on quantity. Quantity production of American Standards may mean mediocrity and retardment of the work. It is perfectly apparent that "half baked" specifications cannot arbitrarily be set up as American Standards and be expected to stand and enjoy the confidence of consumers and manufacturers. The various standardizing bodies should definitely recognize this fact. Their failure to do so would destroy the country's confidence in them and would surely limit their success if not cause their failure. It is not enough that we go through the paper work of setting up American Standards; a specification which is honored by the designation "American Standard" must stand on a sound technical foundation. Such a foundation is best provided by an unselfish, hardworking, technical committee composed of members who are interested, able, and sincere. The tendency for listless action on the part of such a committee jeopardizes the progress of standardization. It results in the establishment of American Standards which are expedients instead of sound technical specifications. I cannot too forcefully emphasize my sincere hope and feeling that the American Standards which are set up may be worthy of the name. I am fully aware that technical effort on the various committees is voluntary and gratis. It can hardly be expected that the members of the committees can continually work for their regular employers by day and for American Standardization by night. The success of standardization depends entirely upon industrial support, financial as well as moral. If the large commercial concerns will assign to the committee work the requisite number of competent engineers, the movement is bound to succeed, in quantity as well as quality. Without such support, success is questionable. In any event, in adopting American Standards let us maintain the highest standard.

In this connection, we might consider the relation of the Federal Specifications Board to the work of the various standardizing bodies. The question is asked, "Why cannot the Federal Specifications Board adopt and use the specifications which have been promulgated as American Standards instead of duplicating the work by writing other specifications, thus weakening the position of the standardizing societies by withholding

Government support?" That important question has been frankly answered somewhat as follows: "U. S. Government Master Specifications are written (and revised when necessary) by as unbiased technical committees as it is practicable to obtain for the purpose of providing adequate specifications for competitive Government purchase of materials; and the business goes to the lowest responsible bidder. Whenever an 'American Standard' definitely provides a material of the grade required, the Government specifications can well be identical to the earlier established standard." In a number of instances standard commercial specifications are accepted. Further progress in this regard would result from increased coöperation between standardizing societies and Government representatives.

The recent war demonstrated that the older methods of warfare must give way to those devised from the results of research, and the President requested the National Academy of Sciences to organize the scientific resources of the country for the national defense. The Academy appointed a committee which later resulted in the organization of the National Research Council of the National Academy of Sciences. After the armistice the President issued an executive order requesting the National Academy of Sciences to perpetuate the research council under its charter on a peace basis. Other governments likewise in the same emergency called to their assistance their scientists and fostered research in the directions necessary to carry on the war. Standardization is akin to research, and could not make much progress without its assistance.

Necessity for Conservatism in the Adoption of Standards

The necessity for conservatism in the adoption of standards is apparent to all who are working on the subject. We do not gain much by issuing a national standard if the manufacturers ignore it, nor if the conditions do not justify it. Consider the situation as regards aircraft at the outbreak of the war: standardization in design was detrimental to progress, but was essential when mass production had to be introduced to manufacture in large quantities in times of emergency.

During the French Revolution the metric system was evolved and all the world was expected to follow it. The French did not adopt the yard or the pound, but the meter, an imaginary part of the distance from Paris to the north pole, which, incidentally, was incorrectly estimated, and the kilogram, a most impracticable substitute for the pound weight. There was introduced into the United States Senate, July 18, 1921, the following proposed legislation:

That upon the lapse of ten years from the date of the passage and approval of this act, the weights and measures of the meter-liter-gram, or metric system, shall be a single standard of weights and measures in the United States of America for the uses set out herein.

I am not proposing to argue the case of the metric system, but thought, as it bears so much on our subject, I would give at least some of the advantages and disadvantages. I am informed that not long ago a person interested in the adoption of the metric system questioned American consular offices throughout the world as to the effect on our commerce if America adopted the metric system. There were over a hundred answers received and every one to the effect that adoption of the metric system would stimulate and increase America's foreign trade. Probably the strongest argument in favor is that the increase in exports alone would compensate for the cost as well as the inconvenience of making the change, and as America's future must depend more and more on our exports to the rest of the world, the strength of that argument must be admitted. The practical arguments advanced as to the ultimate advantages of the metric system are the supposed simplicity and adaptability of the metric measures and the greater ease in making calculations.

Some disadvantages are apparent. Assuming that the intention of the above-quoted law was to cover only the commonly employed units of length (with the derived units of area and volume), mass, and temperature, the arguments against its adoption are the enormous cost and difficulty of transition and the practical impossibility of universal enforcement. It is also claimed by the opponents of the measure that it is only a very slight advantage, if any, that would result to the manufacturers and engineers from the use of the metric system. In the countries where the metric system has been in use for a hundred years or more, the manufacturing standards are by no means universally in this system.

The present units are inseparably connected to the history, the literature, and the standards of manufacture, particularly of shipbuilding, and to the mental concepts of dimensions acquired gradually through life and familiar to all in the shipyard or factory, from the unskilled laborer to the trained engineers, which are fundamental in carrying out work with facility. To change all present standard sizes to conform to metric standards would involve new patterns, rolls, jigs, templets, dies, etc., with corresponding large cost, would not result in exact or simple figures, and would involve confusion in dimensions and in mental conception of sizes. Astronomers and scientists still use the sexagesimal division of the degree and hour into minutes and seconds, notwithstanding the fact that tables for computing in grades and centesimal divisions are in existence, for the reason that their historical records are written in the sexagesimal division, and to change would involve enormous labor considered to be disproportionate to its utilitarian value. Similarly, speeds of seagoing ships are given in knots per hour, even when the dimensions of the ships are given in metric units. Probably the reason for maintaining the established system of sexagesimal division of the degree and hour does not apply so rigidly to the dimensional, mass, or temperature units in the greater portion of scientific work, because previous to the adoption of the metric system there was no uniformity in scientific literature as to these units. In the shipbuilding industry, however, a similar reason exists. The art of naval architecture is largely an empirical one, the success of the design depending largely upon the successful comparison of previously obtained data; therefore the comparative value of different units is an essential part of the work of design, and the judgment of the naval architect, draftsman, designer, business man, purchasing agent, or workman in the new units would be of no value. The valuable files of plans of ships of present and past navies would at once become almost valueless as drawings of precision, as their dimensions would have to be converted, mentally or otherwise, into the new system.

As to the practical arguments in favor which I listed above as simplicity and adaptability and greater ease in making calculations:

In shipbuilding work where the metric system is used there is a constant change in stated dimensions between the millimeter and the centimeter that is apt to be confusing. The units are either too small or too large, and the convenience of the binary subdivision is lacking. The greater number of arguments have been advanced on the advantages of the adaptability of the metric units, with their decimal subdivisions, to calculations; and the practical identity between the kilogram and the weight of a cubic decimeter of distilled water is one of the larger advantages claimed. The shipbuilder, however, has little, if any, use for water of standard density, as his calculations involve salt water of different densities.

Standardization and simplification have for their object increased efficiency by the more economical use of resources, thereby reducing waste, increasing output, and reducing productive costs. Standardization releases energies otherwise wasted in the endless labor over details. Industrial standardization and simplification rendered it possible to produce the automobile at a price which makes it generally available. The necessity for studying standardization in detail and comprehensively is one of the great problems before our industry. It will require all the coöperation, all the knowledge, and all the patience of which human nature is capable to solve this problem, but in the solution is great hope of progress.

In closing, I want to commend the American movement for simplification and standardization. In December, 1921, our Government constituted under the Department of Commerce the Division of Simplified Practice a national campaign toward the elimination of national waste. It makes for economy, facility, and progress. Its influences are widespread; it provides for increased production and distribution of the comforts of life; it leads to better homes and higher standards of living; it is an American ideal worth striving for.

RADIO

Australia Beam Wireless—Satisfactory Results

Manchester *Guardian*, 28 February.—In a statement telegraphed to London, the managing director of the Amalgamated Wireless (Australasia), Ltd., announces that during

the past three weeks the beam wireless station has been thoroughly readjusted and retested, with very satisfactory results.

During the past two days beam signals from England have been heard in Australia throughout the twenty-four hours, and two-day communication at speeds ranging from 250 to 3,000 letters per minute has been established daily for several hours on end, the maximum speeds being equal to those obtained on the relatively short distance beam between England and Canada, and higher than any other long-distance telegraph system in the world today. During a continuous test of seven days the average traffic capacity exceeded 60,000 words per day in each direction, or approximately three times the minimum required in the latest agreement between the Commonwealth Government and the Amalgamated Wireless (Australasia), Ltd.

Communication tests are being continued, and negotiations are proceeding in relation to finalised traffic arrangements. As soon as these are completed, and British official tests are completed, the service will be opened for public traffic.

Ultra Sound Waves and Their Application

Academie de Marine (Tome III, Fascicule 9, 1924).—If a slice of quartz cut perpendicularly to a binary axis is subjected to compression normal to the slice, equal electric charges with opposite signs are induced on its surfaces. If the slice is pressed between two metal plates forming thus an electric condenser, the latter is charged. The charge of the condenser is proportional to the surface of the slice and to the pressure exerted on it, and therefore follows faithfully the variations of pressure. If, instead of compression, the slice is subjected to tension, the charge changes to the opposite. If, therefore, such condenser, inserted in an electric circuit, receives elastic waves which set it in mechanical vibration, it responds to the latter by emitting electric waves of the same frequency, which can be detected and amplified by the processes used in wireless telegraphy.

Inversely, if the condenser made of a slice of quartz is inserted into an oscillating electric circuit, the production of electric oscillations in that circuit will be accompanied by synchronous contractions and dilations of the slice of quartz and, consequently, by the emission into the water of elastic waves of the same frequency. The slice of quartz is then the propagator of ultra-sound.

In practice, one of the armatures is in contact with the sea water, and the other, which is isolated, is kept in a water tight box, the whole constituting the piezo-electric diaphragm which serves for both emitting and receiving.

(a) Ultra-sonic distance and direction finder. A tube set produces electric oscillations in a circuit tuned for the frequency of ultra sound waves to emit, say, 40,000 ultra sound waves (i.e., waves the frequency of which is above those that are audible).

The oscillating circuit fed by the tube acts by induction on another circuit in resonance with it.

A quartz condenser, called piezo-electric diaphragm, connected with the second circuit, transforms the electric oscillations into ultra sound waves of the same frequency. Due to the high frequency adopted, the energy emitted describes a cone the axis of which is normal to the radiating surface and the diffraction of which decreases as the linear dimensions of the emitting surface increase relative to the wave length. The value of the angle at the apex of that cone is indicated by the following formula:

$tg\frac{\omega}{2} = 0.6\frac{\lambda}{d}$, λ being the wave length in the water and d the diameter of vibrating disc.

As soon as the wave train emitted by ordinary manipulation meets an obstacle, the latter reflects it toward the emitting apparatus, which thus becomes automatically tuned to its own frequency.

The ultra-sound waves are transformed into electric oscillations in an oscillating circuit, to which is connected a heterodyne amplifier rendering possible the observation of the echo by the usual processes of wireless telegraphy.

The orientation of the quartz diaphragm at the moment under consideration gives the direction of the obstacle encountered. The distance of the obstacle is determined by the interval of time t elapsing between emission and reception. The velocity of sound in sea water being about 1,500 meters per second, the distance sought is: $\frac{1500 \times t}{2}$.

According to the needs of the ship to be provided with this safety device, it is possible to provide for repetition of the echoes by means of a visual or sonic device placed near the commanding station.

(b) Exact ultrasonic depth finder (for medium depths).—For sounding, the piezo-electric diaphragm is immersed in an horizontal position. Just as for distance and direction finding, this diaphragm is connected with an oscillating device, in which, however, damped oscillations are produced by make and break circuit, the breaks being mechanically effected by means of a turning cam interrupter, gauged to produce one emission per second, or of a multiple of a second in the case of hydrography or laying of cables. The time for the emission of a wave train is furthermore very short (maximum: one thousandth of a second).

The emission of the waves and the echo induce, in the oscillograph, through the intermediary of an amplifier, a current the movement of which is synchronized with that of the turning interrupter. The distance on the scale between the deviations of emission and return gives the depth of the bottom within a meter, since such variation in depth produces a variation of 1/750 of a second on the interval of time elapsed between departure and return, which variation is easy to detect with the wave trains whose time of emission is less than one-thousandth of a second.

MISCELLANEOUS

Construction of the Model of the "Constitution" from the Original Plans of the Ship

Philadelphia *Daily News*, 26 January.—Months of tireless research in tracing a slender, elusive thread through foaming wake left by the most gallant figure of our history upon the seas. Study of yellowed parchment within volumes long left to gather mould in nooks and crannies of waterfronts here and in other cities. Close to 1,000 hours of craftsmanship demanding fingers skilled and as unerring as those of a great surgeon and an immeasureable knowledge of those superb ships with bellying canvas and bluff, blunt bows which loom most majestically in our marine pageantry.

This has been the achievement of George D. Fleury, 1426 North Edgewood Street, Philadelphia. The model of that gallant old frigate, the *Constitution*, is constructed on a scale of ⅛ inch to the foot from the original plans of the ship. The model is mathematically correct from tip of bowsprit to the ports of the admiral's quarters in the stern. Five hundred lines, represented by linen thread and tarred cord, and 500 pulleys little larger than the head of a pin are arranged to the very thousandth of an inch, belayed as they were upon Old Ironsides and so arranged that they alone control the nineteen sails carried upon the three masts.

Fleury constructed this model during hours permitted at home, inspired only by patriotism and by an intense love of ships which was manifest during childhood. With completion of the ship, which naval authorities and designers have lauded, Fleury, who began his toil long before the move to restore the ship now rotting hopelessly at its dock in Boston, or the making of a movie around it, has found a strange apathy of the American people in displaying appreciation or great interest.

Plans for the hull and spars were obtained by Fleury through the aid of his friends in the Captain Herbert G. Sparrow Ship No. 1269, naval post, of which he is a member. It was appreciation of this help which is shown upon a tiny scroll which is enclosed in a diminutive carved sea-chest in the captain's room below decks of model. The "ship's papers" in the little chest bear the name of James J. Burke, 4339 Brown Street, ship's writer of the Sparrow post, and that of Commander Brandt, who helped persuade the government for the first time to permit use of its drawings of a ship of war.

In making the hull, Fleury did not trust to eyesight or calipers, but laid out templates in miniature of those used in shipyards. Following the navy department's original plans for Old Ironsides, he placed these little curved forms outlining the shape of the great hull just as it grew in Hart's shipyard, Boston, in 1794, of "live oak, red cedar, pitch pine and locust," and with great bolts made at the foundry of Paul Revere. Joshua Humphreys was the designer and the *Constitution* was built under the supervision of a board of sea captains who examined each plank and pin. The ship, according to her original papers, carried a crew of 400 sailors and gunners, 4,800 gallons of water, provi-

sions for six months and cost $302,718.84. A price of $500,000 is now demanded just to save those brave old timbers from further decay.

With the hull of white pine complete, Fleury was confronted with the difficult task of rigging his ship. This required lengthy searches through libraries, but it was in the little waterfront holes-in-the-wall that Fleury gradually found little volumes penned by ancient bos'ns and shipbuilders which little by little revealed the *Constitution's* maze of rigging.

Then followed the fashioning of the brass muzzle-loading cannon, each one of which may be loaded with black powder and fired with fuse. Thirty of these cannons he placed on the gun deck and sixteen more on the main deck, each with its little carriage on four wheels and even the block and tackle for dragging the gun back for reloading.

There were some rounds of hearty cheering last July Fourth when Fleury's model, complete with all canvas set rode ripples in the goldfish pond at the firehouse with all the rhythm of the sea and then sent the glittering fish seeking cover as a full broadside belched from the gun deck.

Recently the model has been placed on exhibition in Independence Hall, where Continental Congress waged bitter debate over construction of Ironsides, silenced by the resounding cry of "Millions for defense, but not one cent for tribute."

Seven years Fleury served in the Navy and came out of it in 1919 as a machinist's mate.

"I began work on the *Constitution* in October, 1924, and worked on it until May, 1926. I figured the actual time as a little over 700 hours. The model over-all is forty-three inches with the main yards measuring twelve inches," said Fleury.

CURRENT ARTICLES AND BOOKS

Recent Books

Book of Navy Songs: a carefully compiled collection of the most typical songs sung by the officers and men of the United States Navy.

Curtis, Edward E. *The Organization of the British Army in the American Revolution:* a thorough study of this little-known aspect of our War of Independence.

Fabre-Luce, Alfred. *The Limitations of Victory:* a survey of the causes and results of the war as well as a sketch of European diplomatic history from 1870 to 1914.

Geer, Walter. *Campaigns of the Civil War:* a concise military narrative of the important campaigns of the Civil War.

Phipps, Col. R. W. *Armies of the First French Republic and the Rise of the Marshals of Napoleon I.*

Robinson, J. H. *Ordeal of Civilization:* historical material from the fall of the Roman Empire to the era that has succeeded the World War.

Rucker, W. C. *Leadership:* a manual on conduct and administration. Being, first, general views on the personal traits that make for leadership, and then having particular reference to the Public Health Service of the United States.

Weber, Gustavus A. *The Hydrographic Office; Its History, Activities and Organization:* (Service monographs of the U. S. Government, No. 42).

Randall, Prof. J. G. *Constitutional Problems Under Lincoln:* an important yet hitherto neglected phase of American history presented after fifteen years of close investigation.

Robertson, Sir Wm. *Soldiers and Statesmen, 1914-18:* a narrative of the inner history of the World War containing severe criticisms.

Schluter, Professor W. C. *How to Do Research Work:* a valuable handbook for anyone undertaking research work in any field.

Sturzo, Luigi. *Italy and Facismo:* authoritative criticism of the Facist Régime.

Armstrong, Hamilton Fish, *The New Balkans:* an intensive study of the whole Balkan problem.

Buell, Raymond Leslie, *International Relations:* Part One is devoted to nationalism in its various aspects; Part Two deals with imperialism, emphasizing such problems as modern colonial policies, the Open Door, and capital in backward regions; Part Three discusses the settlement of international disputes.

Goyau, Georges, *Cardinal Mercier:* the biography of this heroic Belgian.

Lambert, F. A., *Football Officiating:* interpreting the rules.

Hocking, Prof. W. E., *Man and the State:* an interpretation of politics as the most practical of the arts.

Howe and Matthews, *American Clipper Ships, 1833-1858.* Vol. 2. Illustrated.

Knowles, David, *The American Civil War:* an account of the causes, characteristics, personalities, and consequences of the Civil War.

Knowles, David, *Lincoln Library of Essential Information:* an up-to-date manual for daily reference, for self-instruction and for general culture.

Littell, Robert, *Read America First:* American essays, mostly literary.

Lovitt and Holtzclaw, *The Mathematics of Business:* a clear, workable and systematic presentation of all the mathematics the business man needs to know.

McCollum and Simmonds, *Food, Nutrition and Health:* a non-technical account of the results of modern researches on foods and nutrition.

Masson, T. L., comp. *Laughs! That Make the Whole World Seem Brighter:* a collection of the best jokes from the best humorists.

Mitchell, J., *Shipbuilding and the Shipbuilding Industry.*

Murphy, M. C., *Athletic Training:* the fundamental principles of correct training for every athletic event, and for the building of strong bodies.

Magazine Articles

Guerard, Albert, "The Next War and How to Nip It," *Scribner's,* April, 1927.

Hurd, Archibald, "America's Increasing Armaments," *Fortnightly Review,* March, 1927.

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Anon, "Naval Disarmament," *Contemporary Review,* March, 1927.

Reilly, Brig.-Gen. H. J., "Where the Responsibility Lies," *Century,* April, 1927.

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Simpich, Frederick, "Mexico In Quest of Salvation," *Century,* April, 1927.

Snow, Franklin, "The Railways and the Panama Canal," *North American Review,* March, 1927.

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Kellogg, F. R., and Kelly, "Who Owns Mexico's Oil?" a debate in dialogue, *Forum,* April, 1927.

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Wharton, C. J., "The Economic Production of Steam by Electricity," *Engineer,* March 11, 1927.

Lippmann, Walter, "Vested Rights and Nationalism in Latin America," *Foreign Affairs,* April, 1927.

Haring, Clarence H., "The Two Americas," *Foreign Affairs,* April, 1927.

Dulles, Allen W., "Some Misconceptions About Disarmament," *Foreign Affairs,* April, 1927.

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Chirol, Sir V., "The Chinese Upheaval," *Contemporary Review,* March, 1927.

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INTERNATIONAL NOTES

FROM 3 MARCH TO 3 APRIL

PREPARED BY PROFESSOR ALLAN WESTCOTT, U. S. NAVAL ACADEMY

CHINA

CAPTURE OF SHANGHAI.—Southern Chinese forces entered the city of Shanghai on March 20-21 without great opposition, many of the troops and leaders of the defense going over to the Southern Army. A reign of terror followed in the native city, but both the attacking and the retreating forces were kept out of the district occupied by foreign troops. There were several clashes at the barriers of the foreign district, in one of which two British Punjabi soldiers were killed and several were wounded. Owing to fears regarding the adequacy of measures taken by French forces to defend the French concession, barricades were erected between the international concession and the French settlement, and at the close of March, American marines guarded this line, prepared, if necessary, to reinforce the French front.

OUTRAGES AT NANKING.—On the morning of March 24, the Northern forces were driven out of Nanking, the ancient capital of China up the river from Shanghai, and the city was occupied by Nationalist troops. In the disorder and looting which followed, at least six foreigners were killed and several were wounded. Those killed included Dr. J. E. Williams, American, vice-president of the University of Nanking, two French Jesuit priests, the British harbormaster, a British sailor, another British subject, and one or more Japanese. Several women were attacked, stripped of clothing, and wounded. A small company of Americans at the American consulate, consisting of Consul John K. Davis, his wife and two children, a guard of eleven sailors under Ensign Phelps, and nine civilians, were driven from the consulate under constant fire to the establishment of the Standard Oil Company on a hill near the city wall. Here their number was raised to a total of thirty-one. From this point signal service was maintained by American seamen with the U.S. destroyers *Noa* and *Preston,* and the British cruiser *Emerald* lying off the city. After two hours, during which the party was subjected to constant attacks by the Chinese, Consul Davis requested that fire be opened by the vessels in the river. At about 3:30 P.M. all three vessels fired shells into the district around the Socony Hill, firing in all about sixty shells in a period of one half hour. Landing parties were sent ashore, and at the same time the party on the hill escaped over the city wall and reached the ships about two hours later. The American senior officer, Rear Admiral Hough, who arrived after the firing, acting with the British commander of the *Emerald,* sent an ultimatum demanding the safe conduct of all foreigners to the river bank by 10:00 A.M. on March 26. Most of the foreigners were brought to the shore under escort of Southern troops on the evening of March 25.

The shells from the naval vessels at once stopped the firing of the Chinese at Socony Hill, and undoubtedly checked the attacks on foreigners in other parts of the city. Contrary to early extravagant reports of losses inflicted by the fire of the vessels, an investigation ordered by General Chang Kai-shek, who reached Nanking on March 26, showed that only six Chinese were killed.

MEASURES OF FOREIGN POWERS.—Following the attacks on foreigners at Nanking, the American, British and Japanese ministers at Peking conferred and agreed to definite recommendations to their Governments regarding reparations. At the close of March, however, it was uncertain whether the United States Government would act separately or in concert with other powers. Evidence of foreigners in Nanking showed clearly that the looting and attacks on foreigners were prearranged, carried on largely by Southern soldiers, and were called off by bugles after the firing from the naval vessels.

After the Nanking attack, measures were taken for the more rapid evacuation of foreigners from the Yangtze Valley and all regions controlled or threatened by the Cantonese. The U.S. cruisers *Richmond, Marblehead,* and *Cincinnati* sailed from Honolulu for China on the evening of March 24, and the Sixth Regiment of Marines was ordered to sail from San Diego on April 4.

DISSENSION AMONG SOUTHERN LEADERS.—Reports from the Southern capital at Hankow indicated increased dissension between the conservative and radical factions of the Koumintang or Nationalist Party, General Chang Kai-shek, as leader of the conservatives, opposing the communistic leanings of the radicals and advocating the elimination of the Soviet envoy, Borodin, from the councils of the party. On March 15, it was reported that the radicals had gained the ascendancy and deprived Chang of his political offices. Chang, however, retained control of the army and at the close of March was in charge of the Southern forces at Shanghai.

CAPTURE OF SOVIET ENVOYS.—The activities of Soviet agents in China were brought out by the seizure at Nanking on February 28, of the Soviet steamer *Paniat Lenina* en route to Hankow, and the arrest of Mme. Borodin, wife of the Russian envoy to the Cantonese Government, with three Russian couriers. It was alleged that the vessel carried tons of red propaganda. Several sharp notes were sent by the Soviet Government to Peking demanding assurances for the safety of the captives and their immediate release. It was reported on March 17 that the Russian emissaries had been ordered to Peking for court martial on charges of espionage.

CORRECTION.—In the January issue of the PROCEEDINGS, p. 118, a statement was made in these "Notes" that "British, French, and also United States marines, were landed [at Hankow in November], for the protection of foreign interests." This statement was in error, as no marines were landed.

LIMITATION OF ARMAMENTS

THREE POWER NAVAL CONFERENCE.—After the refusal of Italy and France to take part in the naval limitation conference proposed by President Coolidge, the suggestion was made from Washington that the United States, Great Britain, and Japan should still proceed with the conference. This proposal was approved by Great Britain and Japan. Second invitations were then sent to France and Italy, expressing the hope that their representatives might attend; but it did not appear likely that either of the Continental nations would depart from their announced policy of avoiding a conference disassociated from the League and limited to the chief naval powers.

UNITED STATES REJECTS ARMS PROPOSALS.—On March 17, the League of Nations secretariat published the observations of the United States Government on the recommendations of a commission of experts which met in Paris in February for the consideration of technical problems connected with limitation of armament. The American document was chiefly negative. It opposed (1) the outlawing of gas warfare, (2) agreements for limitation of poison gas production, (3) the use of government budgets as a criterion for comparing armaments, (4) the consideration of such elements as population, railways, communications, etc., in scaling down armaments. It also disputed the conclusion of the commission that "regional agreements" were useless when the regions in question were not economically self-contained.

It was reported that a British memorandum supporting the American stand on these points was in preparation.

WORK OF PREPARATORY COMMISSION.—The Preparatory Commission for the Disarmament Conference renewed its sessions at Genoa in March, and began again the involved and apparently fruitless discussion of a program of limitation which would meet

the divergent interests of the nations concerned. The clash between the policies supported by the British and Americans on the one hand, and the group of Continental states, headed by France, on the other, appeared clearly in the two draft conventions presented by Lord Cecil for the British and by M. Boncour for France. Briefly stated, the British proposals aim to apply limitation only to the "striking power of a nation," i.e., the trained forces which a nation can bring to the front within a limited time; whereas the French aim at strict limitation of standing armies and all types of semi-military organizations, such as police, and semi-private military associations, but oppose limitation of reserves. The French hope to hold Germany to the clauses of the Versailles Treaty which prohibit conscription in Germany and limit her standing army to 100,000; and then to achieve the difficult task of devising a scheme of limitation which will deprive Germany of her advantage of 67,000,000 population to France's 40,000,000.

After the presentation of the two plans, the Commission decided to proceed with the discussion by examining the two drafts together. In the session of March 29, the American representative, Mr. Gibson, argued strongly against the proposal of the conscription countries that trained reserves should not be included in the estimate of a nation's military strength. A fair statement, he argued, would present the figures in two columns, one giving the active armies and the other the trained reserves.

INTERNATIONAL PROBLEMS

SAAR PROBLEM IN LEAGUE COUNCIL.—The forty-fourth session of the League Council met at Geneva on March 8, under the presidency of Foreign Minister Stresemann of Germany. The chief problem brought forward for settlement was the dispute between France and Germany over the policing of the Saar Valley, until the proposed plebiscite in 1935. The compromise solution adopted was that the French garrison should be withdrawn within three months, and replaced by a railway defense corps recruited from the Allied occupation forces. This will be used only in exceptional circumstances, and, as a concession to Germany, it may be reduced below the number 800 proposed. Germany held that the local gendarmerie would afford adequate protection.

The Council decided to call two conferences, to both of which the United States will be invited: one in November for the drafting of an international convention to abolish import and export restrictions and prohibitions; and another, a conference of experts on unification of economic statistics.

THE OIL WAR.—A volume of this title, written by the Norwegian student, Anton Mohr, and recently published by Harcourt, Brace, and Company, tells of the struggle of the major powers in recent years for control of the world's supply of oil. Comment on the volume, in the *Saturday Review of Literature* for March 19, runs, in part, as follows:

"Some Americans will, perhaps, feel a certain chagrin upon learning that, in the post-war shake-up during which a recalcitrant public opinion kept us out of the mandate plum-pudding, a threat of Britain to shake a Republican Treasury's vulnerable fiscal policy removed the Chester concession from the realm of possibility, and a certain scandal involving oil occurred at home which made us touchy about the whole subject—that in this period lucky Britain was able somehow to increase her oil holdings from some 2 per cent to about 56 per cent of the world's available total supply. Our statesmen and industrialists, hampered as they were, have been badly out-maneuvered by the British. Like it or not, as you may, such seems to be the situation.

"It is true that the United States still produces more than 70 per cent of the world's oil; but the evidence is only too final that in another five years we shall have so far exhausted our supplies that we shall thenceforth have to negotiate with the British for oil as we now do for rubber. Our enormous production only brings the dreaded exhaustion closer. This may, in part, account for the deep respect with which our more serious press has received recently the usually neglected reports of such scientific meetings as that recently held at Pittsburgh, when oil substitutes were being discussed. There was a day when oil was more important even than our ubiquitous crimes of violence. We are said to enjoy the feeling that we are first in size; we are said to be jealous of our independence. And certainly it hurt to meet the British price for rubber,

at least it did if we may judge from Mr. Hoover's cries of rage. Perhaps some of us feel equally humiliated to know that soon we shall have also to go to Britain for oil. One might, of course, venture the suggestion that the key to the situation is not so much the tenderness of our pride as that of certain of our industrial balance sheets. It is also sometimes suggested that some slight and not too costly humiliation of this kind might, in the end, prove beneficial by establishing a more conciliatory and coöperative attitude in the world's general affairs, though to some it may seem at least as likely to engender a taste for reprisal of some sort.

"Aside from these considerations, however, the whole question of imperialistic policy in the effort to control such resources is inevitably raised. It brings into sharp relief the industrial inconsequence of national boundaries; but it shows, too, how the dead hand of past political arrangements can lie with momentous consequence upon the throttle of progress."

UNITED STATES AND LATIN AMERICA

MEXICAN TREATY TERMINATED.—The U. S. Department of State, on March 22, announced its intention not to renew the one year treaty with Mexico providing for mutual assistance in prevention of smuggling across the Mexican border. The treaty was to expire on March 28. The reason given for ending the treaty was that it bound the United States to "coöperation for the enforcement of laws or decrees relating to the importation of commodities of all sorts into another country with which this Government has no arrangement . . . . safeguarding American commerce." The treaty was negotiated last year to facilitate prohibition enforcement. Its pledge of coöperation in regard to supervision of exports from one country to the other would obviously hamper the United States if it decided to lift the embargo on exportation of arms to Mexico, and the decision to end the treaty was taken as a warning that the embargo might be lifted in the near future.

FORGED AMERICAN DESPATCHES.—It was revealed on March 28 that certain documents held by the Mexican Government, and purporting to have been sent from the State Department in Washington to the U. S. Embassy in Mexico City, were, in reality, forgeries, stolen from the Embassy and "doctored" with the object of arousing Mexican hostility and bringing about a rupture of relations. These documents, it was understood, were the theme of recent secret notes to the Mexican Foreign Office.

MARINES IN NICARAGUA.—About 1,600 marines in the transport *Henderson* were landed at Corinto, Nicaragua, on March 7. It was announced on the same date that a force of marines would be sent to Matagalpa, one of the two Nicaraguan cities not then under American protection, for the purpose of safeguarding American and other foreign interests. The U. S. State Department acknowledged on March 24 that rifles, machine guns and munitions to the value of $217,718 had recently been sold by the United States to the Diaz Government. While there were continued reports of military activities, it was generally believed that the Diaz Government, with American support, would remain in control. Further light on the policy of the U. S. Government in Nicaragua was afforded by the announcement from Washington on March 30 that President Coolidge intended to study the possibilities of the Nicaragua canal route, in view of the indications that the Panama Canal will reach the limits of its present capacity within a few years.

SOUTHERN EUROPE

ITALY AND THE BALKANS.—Italy in March again demonstrated her active interest in Balkan affairs by a protest, directly to Jugoslavia and to the major European powers, against alleged preparations of Jugoslavia to support a revolt against the Albanian government of Ahmed Zogu. In answer to this accusation, Jugoslavia charged that Italian officers were directing the concentration of Albanian forces against Jugoslavia and supervising the construction of strategic roads. Jugoslavia expressed willingness to submit the independence and preservation of order in Albania to the control of the League of Nations. As a peaceful solution of the difficulty, the British and French Foreign Offices suggested a direct conference between Jugoslavia and Italy for a treaty in which the two nations should jointly guarantee Albanian integrity and independence. Later, on March 31, Italy

stated that she would enter into discussions with Jugoslavia only on two conditions: (1) That Jugoslavia ratify the Nettuna Conventions relating to Fiume, and (2) that she recognize the preëminence of Italian interests in Albania.

The possible dangers of the Albanian situation arise in part from the fact that President Ahmed Zogu's power in Albania rests largely in the vigorous support of Italy, whereas his pro-Italian policy and alleged aspirations for kingship have aroused strong opposition within the country.

During the March crisis, Italy strengthened her Balkan position by ratifying the Anglo-Franco-Italo-Japanese treaty, which now takes effect, upholding Rumania in possession of the former Russian province of Bessarabia. This insured the friendly attitude of Rumania, in spite of the fact that Alexander I, of Jugoslavia, is a son-in-law of Ferdinand of Rumania, and recently visited the Rumanian capital. Italy also took steps to strengthen her relations with Hungary and Bulgaria. In the recent book on the Balkans by Mr. Hamilton Fish Armstrong, editor of *Foreign Affairs*, the belief is expressed that Italy is destined to take the place of France as the most influential western nation in Balkan problems.

TURKISH-AMERICAN AGREEMENT.—The agreement with Turkey negotiated by Rear Admiral Bristol, and mentioned in last month's "Notes," was later shown by published correspondence to be an extension of the present *modus vivendi* until June 1, 1928, with provisions for continuance of commercial relations and for the resumption of ordinary diplomatic relations "as soon as possible" by the appointment of an ambassador and consuls. Rear Admiral Bristol, it is reported, will soon return to naval duty after his long and extraordinarily effective service at Constantinople and Angora.

TANGIER PARLEYS.—A series of meetings of the Franco-Spanish Tangier Commission was held in Paris in early March. Spain receded from her demand for complete control of the Tangier Zone, but still held out for many concessions which the French and British flatly refuse.

NORTHERN EUROPE

RENEWED GERMAN-POLISH PARLEYS.—Negotiations between Germany and Poland for a commercial treaty were renewed on March 9. The resumption of negotiations was the outcome of exertions on the part of France and England at Geneva, and a part of their policy of exacting concessions from Germany as the price of Rhine evacuation.

SOVIET-LATVIAN TREATY.—A treaty between Latvia and Soviet Russia, pledging each country to neutrality in case the other is attacked by a third nation, was initialed at Kovno on March 11. It was stated that a further agreement was under discussion pledging each power not to join in a coalition hostile to the other. The Latvian pact, following upon the Soviet treaty with Lithuania, was looked upon as a Russian countermove to the efforts of Poland, with alleged British support, to line up the Baltic states against the Soviets. The Latvian Foreign Minister declared that the agreement made with the Soviet Union was in no way in conflict with Latvia's obligations to the League of Nations.

FRANCO-SOVIET DEBT CONFERENCE.—Debt negotiations between France and the Soviet Union were renewed at Paris in March. The Soviet representatives tentatively offered a total payment of 55,000,000 gold francs spread over a period of sixty-two years, as opposed to the French minimum demand of 80,000,000. The Russian offer was, moreover, conditioned on an immediate loan from France of from two to three hundred million francs. Apparently the only prospect of agreement lay in the possibility of French concessions in return for guarantees of large and increasing shipments of Soviet oil.

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REVIEWED BY JOHN A. LEJEUNE, MAJOR GENERAL, COMMANDANT, U. S. MARINE CORPS.

Captain Puleston deserves great credit for having produced a most accurate, concise and conscientious account of the Gallipoli campaign.

His opening chapter, "Political Background," has condensed years of historical matter in a most interesting manner and thus presents at a glance, knowledge, without which a proper understanding of the strategic reasons for this campaign would be impossible.

In the chapter, "Events Leading to the Naval Attack," he has stressed the difficulties confronting the war council which was finally persuaded by Mr. Churchill, one of its members, that the Dardanelles could be forced by a purely naval attack, despite the fact that such a plan was contrary to the views of naval and military authorities and against historical precedent.

Captain Puleston criticizes Lord Fisher for keeping silent in council or for not resigning his position as adviser to Churchill. This may or may not be just. Fisher could easily have felt that the future would present many important questions for the council to decide when his opinion would be both valuable and effective. This is a matter, however, to be weighed carefully by military and naval officers who may be placed in a similar position.

The remaining chapters deal with the various phases of the purely naval actions leading to the realization that the straits could not be forced without the aid of the army. Thereafter we have the heroic struggle between Britons and Turks for the control of the Gallipoli Peninsula. Each phase is accurately depicted by an accompanying chart.

The book should be of particular interest to marines, because it continually brings out situations which would probably be met with in an overseas campaign, and for which marines must be trained.

While the brevity of this book does not permit of an exhaustive study of these situations, yet it is apparent that Captain Puleston must, himself, have made such a study since he constantly touches on the important points, and, in so doing, suggests to the student the lines for further research.

While it is clear that ships will suffer if forced to combat forts, it is also forcibly demonstrated how paralyzing is the effect of ships' fire against shore installations. However, if the success is to be of a permanent nature it should be remembered that land forces must be available for active coöperation at this time.

The recommendation of Captain Fitzmaurice of H.M.S. *Triumph* that Achi Baba be captured to provide observation facilities for the delivery of ships' fire is a most instructive lesson for us to absorb in our future training. It is shown that the delivery of ships' fire in support of troops ashore was much more effective after such positions became available and their proper use developed. If this lesson is not to be lost it is essential that our Navy, in time of peace,

train the necessary communication details, forward observers and aviators necessary to the delivery of this kind of fire.

In like manner the marines should profit by analyzing every phase of this campaign: the loading of the ships to insure the landing of men and material when and where needed; the types and kinds of boats and beetles best suited under various circumstances for landing, provisions for water, types of guns, as affected by the terrain, etc., and, above all, should profit from the knowledge which can be gained by a study of the tactical successes, mistakes and omissions which distinguished this campaign, and which Captain Puleston has so concisely laid before us.

THE ORIGIN OF THE RIGHT OF FISHERY IN TERRITORIAL WATERS. By Percy Thomas Fenn, Jr., Assistant Professor of Political Science in Washington University, St. Louis. Harvard University Press, 1926. $4.00

This book will have little or no interest for the general reader, although it may appeal to the antiquarian. The subject itself, the "Origin of the Right of Fishery in Territorial Waters," is secondary in importance to the controversies which arose in the time of the Stuarts over England's claim to the sovereignty of the seas, and her exclusion of foreign fishermen from her waters.

It is possible that an interesting story might be written of the part the sea and the shore-line has played in international affairs from the earliest times. This end has not been attained in the work under review. In spite of obvious care and valuable research, it must be frankly stated that the author has produced a book too technical to any but the professional student, unless it is studied by the light of some such book as Professor Fulton's *Sovereignty of the Sea.*

The author begins his investigations with "the first formal pronouncement in recorded legal theory on the legal status of the sea and on the right of men to use its products." This was in the early years of the second century. According to the old Roman law, when Rome was supreme in the Mediterranean, the sea "is owned by no one, it is incapable of appropriation, just as is the air, and its use is open freely to all men. The same is true of the shore which derives its character from the sea. . . . . The shore extends to the high water mark of the winter tides—as far as the great storms can drive it." This was the original doctrine of the "Freedom of the Sea."

When Venice and Genoa in the thirteenth century had become great maritime powers, they contested this theory, Venice claiming exclusive dominion over the Adriatic, and Genoa over the Ligurian Sea. As the discoveries of the great voyagers revealed other lands beyond the Mediterranean, and trade developed with the New World and the East Indies, the Pope divided the great oceans between Spain and Portugal. In the north of Europe, England, Germany, Denmark, and the Scandinavian countries claimed dominion and sovereignty over adjacent seas, and these claims led to controversies, conflicting interests, and to wars.

The question of fishery in territorial waters was inseparably associated with that of the sovereignty of the sea which involved compulsory salutes both by guns and sails, definitions of the marine league, and the rights of navigation in rivers and harbors.

These questions produced two great schools of thought, one advocating the *Mare Liberum* and the freedom of commerce. Hugo Grotius was the most brilliant exponent of the school. He objected to the Portuguese prohibiting the passage around Cape of Good Hope of any other nation, but later on he argued in favor of a Dutch monopoly in the East India trade. Selden represented the school which advocated the *Mare Clausum,* and under Charles I attempted to justify the English pretension that the King of England is the Lord of the seas. The author devotes a third of his book to discussing the "open sea" and the "closed sea" theories.

Professor Fenn deals only with the period preceding the beginning of the Seventeenth century. He has collected many interesting historical facts, but they are rather loosely woven into his story; his terminology is unfamiliar, and some of it will send the reader to his dictionary, for example, the "Juri consults," the "glossators," "Regalia," etc. Nearly all his definitions are in Latin, and there are copious quotations in Latin to reënforce his text. A reader unfamiliar with Latin will literally be at sea in the book.

In his preface, the author states that he has not added translations, "not only out of deference to the desire of a reader to see for himself" but also to avoid cumbersomeness. In doing so, however, he closes the book to the average reader, and greatly limits his audience.

It would have been a help if an index—which is indispensable in a work of reference—were provided; the omission is a serious fault in the make-up of the book.

As has been similarly said recently of another rather obscure work, if the *Origin of the Right of Fishery in Territorial Waters* is read in conjunction with an ordinary history of the evolution of territorial waters, "it should prove not only an outline but a real introduction to the subject."

A. G.

THE THEORY AND PRACTICE OF STEERING

By G. F. Leechman. Brown, Son & Ferguson, Ltd., Glasgow. Price 3s. 6d. net.

Reviewed by Rear Admiral D. W. Taylor, (CC) U. S. Navy, Retired

This little book of ninety-four pages and ten chapters covers a large field, discussing as it does steering appliances and apparatus, the actions and reactions of the rudder as manifested upon barges and sailing ships, single screw ships and twin screw ships, the duties of the helmsman and officer of the watch of vessels under way, and finally in Chapter X the question of maneuvering under the helm.

It is intended primarily for junior officers of the British merchant marine and candidates preparing for British Board of Trade examinations.

Covering so much in such a small space, the book is naturally general in its nature and much condensed. For instance, the steering of sailing ships is dealt with in only four pages.

While the analysis of the steering reactions upon rudder and propeller appears a little complicated, the author discussing the forces under six heads, the treatment is essentially sound. It is qualitative throughout, the resultant of opposing forces being never indicated quantitatively.

We find no reference to rudder areas adopted in practice, tactical diameters, and other matters that while connected with steering do not interest the helmsman. On the other hand there is a touch of human interest here and there, as when the author deals with the etiquette of relieving the wheel and the relations between the helmsman and the officer-of the watch.

This little volume should be particularly useful to the helmsman and junior officer desirous of ascertaining the why and wherefore of the phenomena of steering that have come under their observation in practice.

BY THE CITY OF THE LONG SAND —A TALE OF NEW CHINA—By Alice Tisdale Hobart. Macmillan. New York. $3.50

See Secretary's Notes, page 633, this issue.

"Old Ironsides" *in the* Mediterranean *off* Tripoli

THINKING that those who have seen the moving picture "Old Ironsides," as well as those who have not seen it, would be interested in the operations of the good old ship in the Mediterranean, as well as in the portrayal of the character of Commodore Preble, the following material has been prepared for our readers:

Preble is also a good old navy name, and the Commodore had a grandson, Edward Ernest Preble, who was acting master and navigator of the steam sloop *Kearsarge* on the occasion of her conflict with the *Alabama*. There is also on the Navy list today an ensign who is the great great grandson of the old commodore.

That Preble was a "peppery" individual, and that the portrayal of his character in the moving picture was true to life, can be seen from an account of an incident which occurred on the *Constitution* on her trip to the Mediterranean in 1803. Midshipman Charles Morris, who later was to become the first lieutenant of the *Constitution*, under Captain Isaac Hull, after reciting several of his midshipman experiences with the Commodore before leaving Boston, gives the following account in his autobiography published in the U.S. NAVAL INSTITUTE PROCEEDINGS in 1880:

. . . . We had nothing of interest on the passage until near the entrance of the straits of Gibraltar, when, upon a very dark evening, with very light winds, we suddenly found ourselves near a vessel which was evidently a ship of war. The crew was immediately but silently brought to quarters, after which the commodore gave the usual hail, "What ship is that?" The same question was returned; in reply to which the name of our ship was given, and the question repeated. Again the question was returned instead of an answer, and again our ship's name given and the question repeated, without other reply than its repetition. The Commodore's patience seemed now exhausted, and, taking the trumpet, he hailed and said, "I am now going to hail you for the last time. If a proper answer is not returned, I will fire a shot into you." A prompt answer came back, "If you fire a shot, I will return a broadside." Preble then hailed, "What ship is that?" The reply was, "This is His Britannic Majesty's ship *Donnegal*, eighty-four guns, Sir Richard Strahan, an English Commodore. Send your boat on board." Under the excitement of the moment, Preble leaped on the hammocks, and returned for answer, "This is the United States ship *Constitution*, forty-four guns, Edward Preble, an American Commodore, who will be damned before he sends his boat on board of any vessel!" And, turning to the crew, he said, "Blow your matches, boys!" The conversation here ceased, and soon after a boat was heard coming from the stranger, and arrived with a lieutenant from the frigate *Maidstone*. The object of this officer was to apologize for the apparent rudeness which had been displayed. He stated that our ship had not been seen until we had hailed them; that it was, of course, very important to gain time to bring their men to quarters, especially as it was apparent we were not English, and they had no expectation of meeting an American ship of war there; and that this object had induced their delay and misrepresentation in giving the ship's name. These excuses were deemed satisfactory, and the ships separated.

This was the first occasion that had offered to show us what we might expect from our commander, and the spirit and decision which he displayed were hailed with pleasure by all, and at once mitigated greatly the unfriendly feelings which the ebullitions of his temper had produced.

It will be remembered that the U.S.S. *Philadelphia*, Captain Bainbridge, ran aground upon an unchartered shoal near the entrance to the harbor of Tripoli while chasing a Tripolitan corsair, and all attempts to scuttle the ship to keep her from falling into the hands of the enemy were unsuccessful, and the captain and crew were overpowered and taken prisoners. The actual experiences of Lieutenant Stephen Decatur

and his intrepid companions in the cutting out expedition at night to destroy the *Philadelphia* and thus prevent her being used against the United States fleet were even more thrilling than shown by the moving picture.

Midshipman Charles Morris, who was selected for duty with Decatur, said, "The arrangements for the destruction of the *Philadelphia* in the harbor of Tripoli were soon after determined upon and the officers selected for the enterprise. It was my fortune to be among the number, which probably would not have been the case had I remained on shore duties." The complete list of officers of the ketch *Intrepid* were Lieutenant Decatur, commanding; Lieutenants Lawrence, Joseph Bainbridge, and Thorn; Midshipmen Macdonough, Izard, C. Morris, Laws, Davis, and Rowe, and Surgeon Heerman. The Maltese pilot, Salvadore Catalano, afterwards became a sailing-master in the Navy.

But let Midshipman Morris tell the story in his own words, in the following quotation from the U.S. NAVAL INSTITUTE PROCEEDINGS:

A ketch which had been recently captured from the enemy, when on her way to Constantinople with a present of slaves and other articles for the Grand Vizier, was fitted to receive the persons who were specially selected for the enterprise. She was about sixty tons burden and was manned by sixty-four persons, of whom Lieutenant Stephen Decatur had the command. The brig *Siren,* Lieutenant Stewart, was to accompany us, to assist with her boats and to receive the crew of the ketch (which had been named the *Intrepid*), in case of her destruction, which was considered probable. The officers were told to take only a single change of linen, and no time was allowed to prepare stores, as we embarked within an hour after receiving notice, and sailed immediately, on the evening of February 3, 1804. Combustibles had been previously prepared and placed in the vessel, with ship's provisions for two or three week's supply. A Maltese had also been obtained to accompany us as a pilot into the harbor, with which he was well acquainted. We arrived in sight of Tripoli, about the tenth, but the wind was fresh from the westward, with strong indications of an approaching gale. After some consultation between the commanders, the vessels anchored under cover of the night near the entrance, and a boat was sent with the pilot to determine by observation if the entrance was practicable and safe, of which he had expressed strong doubts. To my surprise I was ordered to go with him. We went quite close to the entrance, where we found the surf breaking entirely across it; and my own opinion concurred with that of the pilot that no attempt ought to be made. It was, however, a severe trial to make such a report. I had heard many of the officers treat the doubts of the pilot as the offspring of apprehension, and the weather was not yet so decidedly boisterous as to render it certain that an attempt might not be made, notwithstanding our report. Should such be the case and should it succeed, the imputations upon the pilot might be repeated upon me, and unknown as I was, might be the cause of my ruin in the estimation of my brother officers. My sense of duty and propriety, however, prevailed over these apprehensions, and my report was decidedly against any attempt to enter the harbor at that time, and sustained all the objections of the pilot. These opinions were evidently received with much dissatisfaction by a majority, and with some murmurs, but the attempt was abandoned for the time, and the vessels weighed again to get beyond the view from the town before daylight. This was not done without some difficulty, as the gale increased rapidly. It continued for four or five days with great violence, and drove us considerably to the eastward, and at one time nearer the coast than was agreeable.

Our situation on board was far from comfortable. The commander, three lieutenants, and the surgeon occupied the very small cabin. Six midshipmen and the pilot had a platform laid on the water casks, whose surface they covered when they lay down for sleep, and at so small a distance below the deck that their heads would reach it when seated on the platform. The marines had corresponding accommodations on the opposite side, and the sailors had only the surface of the casks in the hold. To these inconveniences were added the want of any room on the deck for exercise, and the attacks of innumerable vermin, which our predecessors the slaves had left behind them. The provisions proved to be decayed and offensive. Fortunately our confinement did not continue long enough to affect our health or vigor.

On the morning of the sixteenth we again obtained sight of Tripoli, with light winds, pleasant weather, and a smooth sea, and stood in for the town. By arrangement the *Siren* kept far without us during the day, and her appearance had been so

changed as to lull all suspicion of her being a vessel of war. The lightness of the wind allowed us to keep up all appearance of an anxious desire to reach the harbor before night, without bringing us too near to require any other change than the use of drags, which could not be seen from the city. All the crew were also kept below, excepting six or eight persons at a time, that suspicion might not be awakened by unusual numbers; and such as were visible were dressed as Maltese.

As the evening advanced our drags were taken in, so that we were within two miles of the eastern entrance at dark, the *Siren* being some three miles without us. The concerted arrangements were for the ketch to wait for the boats of the *Siren* to join us after dark, that they might accompany us to the attack; but as the sun descended the wind grew fainter, and there was good reason to apprehend that any delay in waiting for the boats might render it very difficult for the ketch to reach the ship. Decatur, therefore, determined to proceed without waiting, and accompanied his decision with the remark, "The fewer the number the greater the honor." One boat from the *Siren*, with six men, had joined us a few days before, and was still with us.

The final arrangements were made, and the respective duties of the several officers, which had been previously allotted, were again specified and explained. The presumed number of our enemy was stated, and the necessity for our utmost exertions enjoined upon us. The watchword *Philadelphia* was issued, to be used as a means of recognition; and as we advanced into the harbor strict silence was enjoined and observed. The injunction, however, appeared to be unnecessary. No one seemed disposed to enter into conversation, but to be absorbed by his own reflections. My own thoughts were busy, now reverting to friends at home, now to the perils we were about to meet. Should I be able to justify the expectations of the former by meeting properly the dangers of the latter? How was I prepared for the death which might possibly be my fate? These, with other of a somber character, mixed with calculations to secure a prominent position when boarding, passed rapidly through my mind; and the minds of others were no doubt employed on similar subjects. The officers and crew were directed to conceal themselves as much as possible, excepting some six or eight. Most of the officers could be distinguished by their dress, and they required concealment more than the sailors. Fortunately, owing to the loss of some articles, which had been replaced by loan from the crew, my own dress corresponded to theirs, which enabled me to keep near Decatur, who I supposed would naturally be among the first to leave the ketch. The wind wafted us slowly into the harbor, the water was smooth, and the young moon gave light enough to distinguish prominent objects. One battery was passed, the *Philadelphia* was in view near several smaller vessels, and the white walls of the city and its batteries were before us. We steered directly for the frigate, and at last the anxious silence was broken by a hail from her, demanding our character and object. Then might be seen the eager movements of the heads of the officers and crew as they were stretched on the deck, ready to leap forward at the word of their commander, but still resting in silence. A conversation was kept up between the frigate and the ketch through our pilot, acting under the dictation of Decatur. We alleged the loss of our anchors, during the last gale, which was true, as reason for wishing to make fast to the frigate till morning, and permission was obtained; but just as the ketch was about coming in contact with the frigate the wind shifted, blowing lightly directly from the frigate, and it left us at rest abeam and about twenty yards from her. This was a moment of great anxiety. We were directly under her guns, motionless and powerless, except by exertions which might betray our character. The *Siren's* boat was, however, in tow, and was leizurely manned, and took a rope to make fast to the ship. She was met by a boat with another rope, when both were united, and each boat returned to its vessel. This rope was passed along the deck and hauled upon by the crew as they lay stretched upon it, and the vessels gradually brought nearer each other. When nearly in contact the suspicions of the enemy appeared to be aroused, and the cry of *"Americanos!"* resounded through the ship. In a moment we were near enough, and the order, "Board!" was given; and with this cry our men were soon on the decks of the frigate. The surprise had been complete; there was no time for any preparation, and the enemy made scarcely a show of resistance. A few men were killed, one was made prisoner, and the remainder leaped overboard and probably reached their cruisers which were anchored near the ship. In less than twenty minutes the ship had been carried, the combustibles distributed and set on fire, and all our party again on board the ketch. By great exertions, the two vessels were separated before the fire, which was pouring from the ports of the ship, enveloped the ketch also.

Up to this time the ships and batteries of the enemy had remained silent, but they were now prepared to act: and when the crew of the ketch gave three cheers in exultation of their success,

they received the return of a general discharge from the enemy. The confusion of the moment probably prevented much care in their direction, and, though under the fire of nearly a hundred pieces for half an hour, the only shot which struck the ketch was one through the topgallant sail. We were in greater danger from the ship, whose broadside commanded the passage by which we were retreating, and whose guns were loaded and were discharged as they became heated. We escaped these also, and while urging the ketch onwards with sweeps, the crew were commenting upon the beauty of the spray thrown up by the shots between us and the brilliant light of the ship, rather than calculating any danger that might be apprehended from the contact. The appearance of the ship was magnificent. The flames in the interior illuminated her ports and, ascending to her rigging and masts, formed columns of fire, which, meeting the tops, were reflected into beautiful capitals; whilst the occasional discharge of her guns gave an idea of some directing spirit within her. The walls of the city and its batteries, and the masts and rigging of cruisers at anchor, brilliantly illuminated, and animated by the discharge of artillery, formed worthy adjuncts and an appropriate background to the picture. Favored by a light breeze our exertions soon carried us beyond the range of their shot, and at the entrance of the harbor we met the boats of the *Siren,* which had been intended to co-operate with us, whose crews rejoiced at our success, whilst they grieved at not having been able to participate in it.

The plan of attack prescribed by our commander was for united action to obtain possession of the ship, with the exception of a boat to intercept communication to the shore, and for the surgeon and a few men to secure the ketch to the ship. When possession was secured, each lieutenant, with a midshipman and specified men, was to receive a portion of the prepared combustibles, and distribute them in designated parts of the berth-deck and in the forward storerooms, and a smaller party under a midshipman to do the same in the cockpit, and there await orders to set fire, that all might be done at the same time and give all a chance for safe retreat. The party for the cockpit was assigned to my charge. My object in keeping near Lieutenant Decatur, when we were approaching the ship, was that by watching his actions, I could be governed by these rather than by his orders when the boarding should take place. It was well that this course was taken, for Decatur had leaped to the main chain plates of the frigate, before the order to board was given. I had leaped with him, and probably more favored by circumstances, was able to reach the deck by the time he had gained the rail. The enemy were already leaping over the opposite side and made no resistance; but Decatur, under the supposition that he was first on board, was about to strike me, when I accidentally turned and stayed his uplifted arm by the watchword and mutual recognition. On my way to my station, after examining the cabin, when passing forward, we met again under similar circumstances. Passing through the wardroom, which I found deserted, I awaited in the cockpit the men who had gone for the combustibles. These were so delayed that we had none when the order was given to set fire; but, as they came a moment after, they were distributed, and fire communicated before we left our station. In the mean time the fire on the deck above us had communicated so rapidly that it was with no small difficulty and danger that our party reached the spardeck by the forward hatchways. All the others had already rejoined the ketch, except Decatur, who remained on the rail till all the others were on board; and the bow of the ketch had already swung off from the ship when he joined us by leaping into the rigging of the ketch.

The success of this enterprise added much to the reputation of the Navy, both at home and abroad. Great credit was given and was justly due to Commodore Preble, who directed and first designed it, and to Lieutenant Decatur, who volunteered to execute it, and to whose coolness, self-possession, resources, and intrepidity its success was in an eminent degree due. The accident of having preceded others a few seconds, when all were on board within a minute, gave a prominence in public estimation to my own exertions, to which may be ascribed favorable opinions that probably had a beneficial influence on all my subsequent professional life. I was not, however, vain enough to feel that I deserved any particular merit from this accident, and could not but be conscious that I really deserved more for my faithful report against an attempt to enter the harbor when we first arrived than for an accidental precedence which had not cost me half the effort.

Midshipman Morris was soon afterwards appointed an acting-lieutenant of the brig *Argus.* Morris describes the loss of the ketch *Intrepid* in the following manner:

On September 4, the ketch *Intrepid,* which had brought stores to the squadron, was filled with a hundred barrels of powder and a hundred and fifty loaded shells for the purpose of being taken into the harbor and exploded, with a view to shatter

the castle and batteries, and destroy or injure the vessels. She was commanded by Lieutenant Somers, and accompanied by my old messmate, Henry Wadsworth, and Midshipman Joseph Israel and ten picked men. The ketch left the squadron after dark. Every person was anxiously awaiting the event, and about eleven the explosion took place, apparently near the entrance, instead of the bottom of the harbor, as was proposed. The concerted signal to denote the safety of the party was then waited for with increased anxiety; but the watchful eyes of all in the squadron looked for it in vain, till daylight came, and with it the conviction that they had been capturd or had perished. The latter proved to be the fact. How, can never be accurately known; but the probability is that the explosion was premature and accidental, though at the time the general feeling ascribed it to design rather than to submit to disappointment and capture by boats supposed to have met and assailed them.

How *the* "Constitution" Escaped

EDITOR'S NOTE.—It will be recalled that the *Constitution,* Captain Isaac Hull, found herself in the presence of a greatly superior British force shortly after daylight, July 17, 1812, off the Jersey coast, and, having an untrained crew, sought to escape.

The *Constitution* first attempted to escape by outsailing the British, but there was little or no wind and the pursuers gradually closed the distance when the ship's boats were lowered and manned and an effort made to tow.

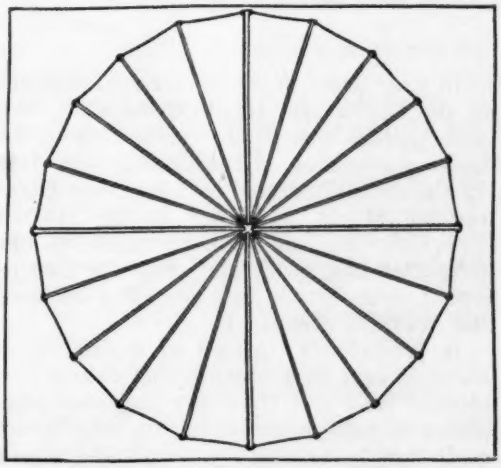
The famous sixty-hour chase then began, and the ship finally escaped by means of "kedging," which is the seamanship term for warping a ship through the water by means of the ship's kedges (anchors from one-sixth to one-tenth the weight of the bower anchor) and warps (hawsers).

In order that non-technical readers may better understand, it may be explained that "kedging" is an operation in which the ship's kedges together with their warps are carried out in the boats alternately, towards the place where the ship is endeavoring to arrive, so that when she is drawn up close to one, another is carried out to be a sufficient distance ahead, and being sunk, serves to fix the other warp, by which she may be further advanced. The first kedge is then weighed, sent ahead, and the operation is repeated.

In December, 1925, the *Scientific American* "published a communication from a gentleman who said that the carpenter on board the *Constitution* during her escape from the British was one of the ancestors of his family, and that among his papers they found some notes describing how the kedge anchor was built on board of oak timbers, canvas and rope, and was of umbrella-like collapsible type." The editor of the PROCEEDINGS received the above letter from Mr. J. Bernard Walker, editor-emeritus of the *Scientific American,* who added "I would like very much to hear what you think of this story and I should be greatly obliged if you can favor me with a print of the picture which is shown on page 1510 of the August (1926) PROCEEDINGS."

The article referred to by Mr. Walker was the one by Lieutenant Commander McHenry, which was accompanied by a photograph of a kedge anchor now in the Naval Academy Museum, and said to have been used by the *Constitution* in her escape.

There were two ways of "kedging" in those days: (1) to take out and carry in small boat (s) anchor (s) to be lowered to the bottom sufficiently large to hold and yet small enough to be man-handled by a boat's crew with the boat gear; and (2) to take out and carry in small boat(s) anchor(s) known as sea anchors made of canvas and ribs or frames and of sufficient buoyancy when a pull was made laterally on the attached hawser to remain on the surface.

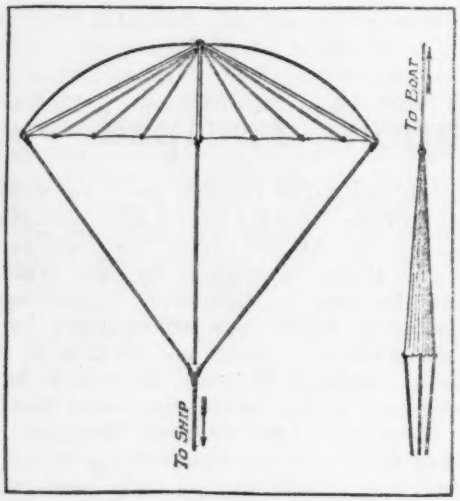


"CONSTITUTION'S" SEA ANCHOR OPEN

A top view of the wood-and-canvas sea anchor built hastily, while the ship was endeavoring to escape from the enemy

The question involved in this discussion was to determine which form of anchor was used by the *Constitution* and whether or not both forms were used, etc.

At the request of the editor, Rear Admiral Elliot Snow (Construction Corps),



SEA ANCHOR OPEN AND CLOSED
When boats were towing anchor, it closed. When ship's crew hauled away, the "umbrella" opened, serving as drag

U.S. Navy (Retired), made an investigation, and the following information was collected and sent in a series of letters to Mr. Walker via the Naval Institute:

I

In your letter to the Secretary-Treasurer of the U.S. Naval Institute you said, "We shall publish this picture (referring to the kedging operation of the *Constitution,* July 17-19, 1812, illustrated by Lieutenant Commander H. D. McHenry in the August PROCEEDINGS) and perhaps republish our purported emergency anchor of the *Constitution* in an article in some early issue of the *Scientific American.*"

A preliminary, instead of a final comment, is sent as I observe that nearly two months have run since you indicated your intent to publish something on this "at an early date." Enclosed you will find copies of records taken from the following sources, all eye witnesses to the event:

(a) *Three Years on the Frigate Constitution,* by Moses Smith, a survivor of the Old Ironsides crew, published in Boston in 1846.

(b) Extract from Journal of Amos A. Evans, Surgeon U.S. Navy, on the *Constitution* during the chase.

(c) Report of Commodore Isaac Hull to the Secretary of the Navy, July 21, 1812.

In addition to this I have asked the Navy Department Library to abstract and send to me the following additional accounts, copies of which will be sent to you upon receipt:

(d) An article published in the *United Service Magazine,* September, 1891, page 272, name of article and its author not yet given me.

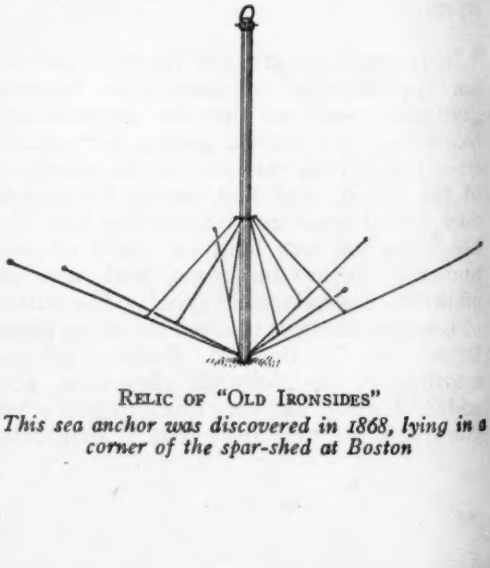
(e) *Autobiography of Commodore Chas. Morris,* published by the U.S. Naval Institute in 1880 in the issue for the quarter ending June 30, page 161.

Finally, I hope to reach the grandson or great grandson of Isaac Hull, who has a lot of original papers of his sire. Some may touch in detail on this incident. My final comment must accordingly be withheld until I am sure that nothing can be had from this last named source.

Judging, however, from the statement of Moses Smith (a) and Journal of Surgeon Evans (b) and what you published in the *Scientific American* of December, 1925, I conclude that two and probably three methods were used, and perhaps at the same time.

1. Straight attempts to tow by boats.
2. Kedging with two kedges (small anchors).
3. Backing up boats with floating sea anchors, as described in *Scientific American,* December, 1925.

Probably anywhere from five to seven boats were in the water at once (however, the *Constellation* (36) on her first commissioning in 1797 carried only four boats),



RELIC OF "OLD IRONSIDES"
This sea anchor was discovered in 1868, lying in a corner of the spar-shed at Boston

so that it would have been possible for at least two or three methods to have been used at the same time. I feel satisfied that the use alone of the sea drag could not possibly have made Old Ironsides forge ahead at three knots.

If you decide to republish the whole story of this maneuver, I suggest that you obtain and publish graphic reproductions of some of the original notes and obtain from Lieutenant W. H. Gregg, U.S.N., a copy of the photo of the *Constitution* sea drag on exhibition at the naval exhibit of the Sesqui-Centennial, Building 29, Navy Yard, Philadelphia, Pennsylvania. (EDITOR'S NOTE: This sea drag referred to came from the Naval Academy last summer and is the one referred to by Mr. Walker in the McHenry article in the 1926 August issue of the PROCEEDINGS, so it is not, as might be supposed by Admiral Snow, new evidence).

II

(*a*) "CONSTITUTION"—KEDGING INCIDENT.

Extract from *Naval Scenes in the Last War; or Three Years on Board the Frigate Constitution*, by Moses Smith, a survivor of Old Ironsides' crew (1846).

We were off Little Egg Harbor on the New Jersey shore at the time, stretching in toward the Delaware Bay. The enemy had drawn in between us and the land, so the prospect was that they might cut us off from the Capes.

Mr. Morris now spoke to Captain Hull. "There is one thing, sir, I think we'd better try."

"What's that?" replied Hull.

"Try to kedge her off," said the lieutenant.

"We'll try it," responded the Captain, "but I imagine you'll fail. That water's too deep here; we're at least forty fathoms."

The kedges were soon under way. . . . . We brought all the spare rigging out of the boatswain's storeroom and bent on so much line to the kedges that before one short peak came out of the ground we let go the other kedge; this kept the frigate swinging ahead all the while at the rate of about three knots an hour; with the help of the boats. . . . . The boats were all manned. In one of them Midshipman Bourie, as he looked toward the enemy and thought of the possibility of an engagement, exclaimed, "Oh, that I had my pistols here that I might defend my boat to the last."

(Memo from Rear Admiral Snow as to probable number of boats employed.)

The boats carried by the U.S.S. *Constellation* (36) in 1797 at the time of her first commissioning numbered, in all, four:

One pinnace, 24 ft. long, 7 ft. broad, 2 ft. 8 in. deep.

One long boat, 33 ft. long, 9 ft. broad, 4 ft. deep.

One jolly boat, 22 ft. long, 6½ ft. broad, 2 ft. 4 in. deep.

One barge, 33 ft. long, 7 ft broad, 2 ft. 6 in. deep.

The *Constitution* (44) must have carried at least this number and probably one or several more. See mention of cutter numbers by Surgeon Evans.

III

(*b*) LOG OR JOURNAL OF SURGEON A. A. EVANS.

July 17, 1812. At 5:15 A.M., it being calm and the ship having no steerage way, hoisted out the first cutter and got the boats ahead to turn the ship's head to southward. Got 24-pounder up off the gun deck for a stern chaser and the long 18-pounder from the forecastle aft. Cut away the taffrail to give them room and ran two guns out the cabin windows.

At 6:30 A.M., sounded in 26 fathoms of water.

At 7:00 A.M., got out a kedge and warped the ship ahead.

At 8.00 A.M., employed warping and towing the ship ahead.

At 10:00 A.M., started about 2,335 gallons of water and pumped it all out. Manned the first cutter to tow the ship.

From 10:00 A.M. to meridian employed warping and towing.

At 7:00 P.M., observed enemy towing with their boats; lower down first cutter, green cutter and gig and sent them ahead to tow the ship.

At 8:00 P.M., first and fifth cutters ahead towing ship.

(Note: May have been backed up by the sea drag when boat's crews were resting on oars. Ship evidently had five cutters, a gig, and a jolly boat, and possibly a pinnace.)

July 18, 1812. At 2:00 A.M., sounded in 23 fathoms of water.

At 5:00 A.M., passed about gun short distance to windward of one of the frigates. Hoisted to the first cutter.

(Memo: The journal makes no further reference to towing or kedging, but it contains all of the incidents so frequently cited and looks much like a copy of the ship's log. It has data as to the setting and taking in sail, wetting down sails and warning the American merchantman by displaying English colors to offset the English display

of U.S. colors in their attempt to entice her within range of their guns, etc.)

IV

(*c*) EXTRACT FROM REPORT OF CAPTAIN ISAAC HULL.

Dated July 21, 1812, concerning method of escape of U.S.S. Frigate *Constitution* under his command from the British Squadron, July 17-20, 1812.

U. S. Frigate *Constitution*,
At Sea, July 21, 1812.

SIR:

. . . . . .

In this situation finding ourselves, in only twenty-four fathoms water (by the suggestion of that valuable officer Lieutenant Morris) I determined to try and warp the Ship ahead, by carrying out anchors and warp her up to them. Three or four hundred fathoms of rope was instantly got up, and two anchors got ready and sent ahead, by which means we began to gain ahead of the Enemy. They, however, soon saw our Boats carrying out the anchors, and adopted the same plan under very advantageous circumstances, as all the Boats, from the ship furthermost off were sent to Tow, and warp up those nearest us by which means they again came up, so that at 9 the Ship nearest us began firing her bow guns, which we instantly returned by our stern guns in the cabin, and on the quarter deck. All the shot from the Enemy fell short, but we have reason to believe that some of ours went on board her, as we could not see them strike the water. Soon after 9 a second frigate passed under our lee, and opened her Broadside, but finding her shot fall short, discontinued her fire, but continued as did all the rest of them to make every possible exertion to get up with us. From 9 to 12 all hands were employed in warping the Ship ahead, and in starting some of the water in the main Hold, to lighten her, which with the help of a light air, we rather gained on the Enemy, or at least held our own. About 2 in the afternoon, all the Boats from the Line of Battle Ship, and some of the Frigates, were sent to the Frigate nearest to us, to endeavor to tow her up, but a light breeze sprung up, which enabled us to hold way with her notwithstanding they had Eight or Ten Boats ahead, and all her sails furled to tow her to windward. The wind continued light until 11 at night, and the Boats were kept ahead towing, and warping to keep out of reach of the Enemy, Three of the Frigates being very near us. At 11 we got a light breeze from the Southward, the boats came alongside, and were hoisted up, the Ship having too much way to keep them ahead, the Enemy still in chase, and very near.

. . . . . .

I have the Honour to be,
with very great Respect,
Sir,
Your Ob Hbl Servant
ISAAC HULL

To
The Honble PAUL HAMILTON,
Secretary of the Navy
Washington

V

I find that at least some six weeks or two months will probably run their course before I can hope to get in touch with and possibly hear from Captain Hull, because I shall have to take a very roundabout way of finding his address. I therefore now hand on to you two remaining bits of history about the kedging of Old Ironsides; these were obtained through the courtesy of Lieutenant Commander Richard Wainwright, U.S.N. (Retired), Superintendent of the Navy Department Library.

(*d*) THE "UNITED SERVICE MAGAZINE."

Volume 6, July-December, 1891:

Having sounded in twenty-four fathoms, Lieutenant Morris suggested to his superior the plan of running out kedges and warping the ship ahead. Three or four hundred fathoms of rope was at once made ready, attached to two anchors, and sent ahead a full half mile and let go; then the crew clapped on and walked cheerily away, overrunning and tripping the kedge as she came up, gliding slowly ahead, while another line and kedge was being rapidly placed in position. (Note. The name of the contributor of this account was not given to me.)

(*e*) "PROCEEDINGS OF THE U.S. NAVAL INSTITUTE."

With our minds excited to the utmost to devise means for escape, I happened to recollect that, when obliged by the timidity of my old commander, Cox, to warp the *President* in and out of harbors where others depended on sails, our practice had enabled us to give her a speed of nearly three miles an hour. We had been on soundings the day before and on trying we found twenty-six fathoms. This depth was unfavorably great, but it gave me confidence to suggest to Captain Hull the expediencey of attempting to warp the ship ahead. He acceded at once and in

a short time (about 7:00 A.M.) the launch and first cutter were sent ahead with a kedge, and all the hawsers and rigging, from five inches and upward that could be found, making nearly a mile of length. When the kedge was thrown the men hauled on the connecting hawser slowly and carefully at first, till the ship was in motion and gradually increasing until sufficient velocity was given to continue until the anchor could again be taken ahead, when the same process was repeated. In this way the ship was soon placed out of range of our enemy's guns, and by continued exertions when the wind failed, and giving every possible advantage to the sails when we had air enough to fill them, we prevented them from again closing very near us.

In view of the statements I have thus far quoted to you from three eye witnesses, to wit: Lieutenant Morris, Surgeon Evans, and Moses Smith of gun No. 1, I am satisfied that the frigate was *not* saved from capture through the use of the floating sea anchor or drag as described in the December, 1925, issue of the *Scientific American*. I think however that it is possible that this sea drag may have been used to back up the boats, when through fatigue the boats crews may have been resting on their oars, at some distance from the frigate. The statement of Moses Smith lends some color to this conjecture.

An examination of the list of officers of the *Constitution* of that date failed to disclose the name of the ship's carpenter (or rather, the name was not found on the list). This does not necessarily mean however that Gideon Woodwell did not fill that position. In those days, the boatswain, gunner, carpenter, and sailmaker were known as "forward" officers, and as far as I now know their names were listed at the tail end of the officer roster.

Yours truly,

ELLIOT SNOW,
Rear Admiral (CC), U.S.N.

October 31, 1926

VI

Although I am now in touch with Mr. M. O. C. Hull (the grandson of Commodore Isaac Hull) and from that gentleman have learned something more about the kedging incident on Old Ironsides, all he can tell me, without consulting the family archives, which are not near at hand, is his conception of the phrasing of Commodore Hull's memo on this maneuver. It is this. "Our escape was greatly aided by the adroit use of a sea anchor." This strengthens considerably the view set forth in my letter to you of October 31, that "the sea anchor may have been used to back up the boats, etc."

In short, it seems fairly well established that both kedging and "The adroit use of a sea anchor" helped Old Ironsides to escape.

VII

The search for information wherewith to establish the facts connected with the escape of Old Ironsides (she did not at that time bear this name) has resulted in one more item insofar as Gideon Woodwell was connected with that incident.

His granddaughter, Mrs. Betsey Junkins, on the occasion of celebrating her eighty-seventh birthday, December 31, 1897, told the following bit of her early life history, which was published in a Newberryport, Massachusetts, paper, December 31, 1897. Speaking of her grandfather she said "After his return from the war [meaning the Revolutionary, during which he had participated in the naval engagement between the *Civil Usage* and the *Orient*] grandfather helped build the historic frigate *Constitution* in 1797. In 1812 when the *Constitution* made her escape from a fleet of British men-of-war by means of umbrellas, grandfather was a ship's carpenter on board of the frigate and helped construct the umbrellas."

At the time "Aunt Betsey, as she was called, made this statement, she was in full possession of all her faculties. I am also informed that the descendants of Mrs. Junkins are now living in Portsmouth, New Hampshire, and the descendants of Gideon Woodwell live in Newburyport. I may at some later date, when less pressed for time, probe these two sources.

I learn that *Harper's Weekly* of December 31, 1881, gives a sketch of the escape, but I have not yet had time to look it up.

VIII

Professor Herman F. Krafft, Curator, U.S. Naval Academy Museum, has contributed the following information:

In the December, 1925, *Scientific American* under the caption, "The *Constitution* Saved by Canvas Sea Anchor," the writer quotes from some "family notes," left by his ancestor, Gideon Woodwell, a ship's carpenter on the *Constitution*, in an

attempt to prove that an umbrella-like device saved the frigate in her memorable chase by a British squadron in July, 1812. In another and later article in the PROCEEDINGS (August, 1926), entitled "Kedging the *Constitution*," Lieutenant Commander H. D. McHenry describes the sea anchor which has for the last half century been labeled in our naval museums as the anchor that enabled Hull to make his remarkable "get away." The question now is which of these two did the trick.

Probably neither played a decisive rôle in the escape. And yet, it is entirely within the range of possibility that both may have played some part in events of that sixty-hour pursuit of one ship by five.

There seems to be no doubt that a Gideon Woodwell was a ship's carpenter, or at least a carpenter's mate, on the *Constitution* in 1812. Neither the *Navy Register* of 1812 nor the Office of Naval Records in the Navy Department lists his name. But in an old manuscript, "Muster of carpenters working in Navy Yard, Charlestown, Massachusetts, by order of Com. Isaac Hull," Gideon Woodwell heads a list of carpenters for July and August, 1816. It is therefore quite probable that four years earlier this Gideon Woodwell and some of his fellow carpenters improvised on board the *Constitution* one or more wood and canvas anchors, which Captain Hull intended to try out during the long chase.

The umbrella-shaped sea anchor at the Naval Academy, described as before mentioned in the August PROCEEDINGS, was found in a shed at the Boston Navy Yard in 1874. Its discoverer, Rear Admiral George F. Winslow, Medical Corps, U. S. Navy, who was born the year after Hull died, and who was at the time of his discovery thirty years old, showed his find to a number of old officers of that day—officers whose lives were closely identified with the War of 1812, or who had had the traditions of that war at first hand. The officers consulted were of the opinion that the newly found sea anchor had formed a part of the equipment of the *Constitution* in 1812. Winslow writes, under date of October 25, 1926, that the above are the facts and that "there is no one now who can tell any more about it." This "sea anchor" which "looked old" when he found it, he had scraped, cleaned, and placed on exhibition in the museum of the Boston Naval Library and Institute. During the last half century it has been a familiar sight to the succeeding generation of naval officers.

A rear admiral, retired eight years ago, writes that he had known this umbrella-like anchor since his midshipman days in 1879. He adds: "It was quite authentic so I believe.—It was of wood—with metal ribs, covered with canvas and had a roping around the canvas. The whole was umbrella-shaped with a wooden piece long enough to allow a clevice at the forward end and a shackle at the other end—for a towing line to haul it ahead or trip it, and the shackle for the hauling or working hawser."

Luce, in the 1866 edition of his *Seamanship*, page 343, calls this type of sea anchor a "parachute," which he defines as "a contrivance of canvas that will open and shut like an umbrella. By hauling on the line aft, it is opened out and offers its greatest resistance to the water, thus forcing the ship ahead; and on hauling it forward again, it closes up. The *Essex*, during her celebrated cruise in the Pacific, under Commodore Porter, made use of parachutes, which were dropped from the spritsail-yard, and having a hauling line led in through blocks on the quarters, the watch clapped on, and 'walking away,' managed by this means to warp the frigate ahead a knot or two per hour."

In our day these old "parachutes" are generally called drags or sea anchors. Luce explains that a drag may be almost any kind of contrivance for preventing too great lee way, or to keep a ship's head to the wind, for example, in a heavy blow. He cites a case where a brig, in danger of broaching to in a hurricane, was saved by paying out the largest hawser a considerable distance in the wake. For similar purposes Luce says a sea anchor "may frequently be of the greatest possible use." A common form of sea anchor consisted of three spars lashed together to form a triangle with a bulging mass of canvas reënforced with rope netting made fast to the three legs of the triangle. This, trailing astern, acted as a drag. Devices like these and the "parachutes" under discussion could be used as drags, e.g., to save a dismasted vessel from drifting too much toward a lee shore. There might be a necessity to warp a man-of-war within range, or out of reach of the enemy's guns, or to wind ship in situations where too great depths prevented the use of regular kedges.

Kedges are described by Luce as small anchors light enough to be carried ahead in boats. They were useful for warping a vessel in and out of narrow rivers and harbors—a great necessity in days of sail. Both Charles Morris and J. Fenimore Cooper, in their accounts of the escape of the *Constitution*, say that Hull used kedges during the chase. Writing in the period of sail they must have used the word accurately, that is, to mean a small iron anchor, not a sea anchor. Morris re-

marks that just before he got out the kedges he found twenty-six fathoms—"a depth unfavorably great" for ordinary anchors, but not for sea anchors which would float. Retired officers of the present day wonder how at such depths even a light kedge could have been tripped quickly, that is, how any speed could have been made with such an anchor. But we must remember that Hull had one boat's crew carrying ahead one kedge while another crew was ready to trip the second kedge the instant the men on board the frigate changed back to the first hawser. In his report to the Secretary of the Navy, Hull uses the general word anchor. He says: "I determined to try and warp the ship ahead by carrying out anchors and warping her up to them; three or four hundred fathoms of rope were *instantly* got up, and two anchors got ready and sent ahead, by which means we began to gain ahead of the enemy." It is noteworthy in passing to observe that Hull acted *instantly* (not in italics in the original), a word that suggests the use of the means ready to hand. "Instantly" implies the bringing from below of the kedges, a regular part of the equipment of every man-of-war of those days. If after trial these were found not practical in the great depth, Hull would get out his sea anchor, if he had one. As Luce maintains these were often of "the greatest possible use," the presumption is that the *Constitution*, especially in war time, would be provided with so necessary a thing. The iron framed sea anchor, once gotten out, might prove more expeditious for kedging, or it might suggest the making of others entirely of wood for similar use, or in place of sweeps as Luce says Porter used them on the *Essex* in this same year.

Hull was an officer of extraordinary resourcefulness. In the emergency, with a crew of 450, free to concentrate on the one great object—escape—he had plenty of men to try all sorts of experiments—even to the breaking out of heavy oak timber, six to eight inches square, to be tapered down to 3½ inches, for new sea anchors, as the Woodwell article says he did. Hull doubtless tried all his boats for towing. An old contemporary oil painting shows five boats at this operation. But if towing did not produce sufficient speed, he would try kedging, an operation in which he could put to work much of his large man power. At times Hull probably tried towing, kedging, and even sailing simultaneously, picking up his boats on the run, as contemporary accounts have it.

For the last century a fine mass of tradition has grown around Old Ironsides and around her greatest skipper, Isaac Hull. Her sea anchor, now at the Naval Academy, was found and proclaimed half a century ago when a number of those who had served on her in 1812 were still alive. Had there been any challenge then to the claim of this old relic, we ought to be able to find some record of it. A careful search reveals no such challenge. The sea anchor is an interesting relic of the days of sail. But it is more; it speaks eloquently of one of the greatest traditions of the *Constitution* and of Isaac Hull, whose seamanship in eluding the British squadron shows, as his first lieutenant puts it, "the advantages to be expected from perseverance under the most discouraging circumstances so long as *any* chance of success may remain."

Secretary's Notes

Nine Years Ago

Nine years ago, on May 4, 1918, Admiral Sir Lewis Bayly, Commander-in-Chief, Queenstown, promulgated the following to his command:

"On the anniversary of the arrival of the first United States' men-of-war at Queenstown, I wish to express my deep gratitude to the United States' officers and ratings for the skill, energy and unfailing good nature which they have all consistently shown, and which qualities have so materially assisted the war by enabling the ships of the Allied Powers to cross the ocean in comparative freedom.

"To command you is an honour, to work with you is a pleasure, and to know you is to know the best traits of the Anglo-Saxon race."

"Ask Me Another"

Article 1 of the so-called "Submarine and Noxious Gasses Treaty" of the Washington Conference reads as follows:

The Signatory Powers declare that among the rules adopted by civilized nations for the protection of the lives of neutrals and noncombatants at sea in time of war, the following are to be deemed an established part of international law:

(1) A merchant vessel must be ordered to submit to visit and search to determine its character before it can be seized.

A merchant vessel must not be attacked unless it refuse to submit to visit and search after warning, or to proceed as directed after seizure.

A merchant vessel must not be destroyed unless the crew and passengers have been first placed in safety.

(2) Belligerent submarines are not under any circumstances exempt from the universal rules above stated; and if a submarine can not capture a merchant vessel in conformity with these rules the existing law of nations requires it to desist from attack and from seizure and to permit the merchant vessel to proceed unmolested.

Question: In case a belligerent "Q" boat, the so-called "mystery ship" of the late war, constructed to look like a merchantman, falls in with an enemy submarine, how will the latter exercise the right of visit and search?

The answer to the next question looks simple, and even Senator Root said everyone knew the answer; but does one? The question is, "What is a merchant vessel?"

"Answer This One"

If it is illegal for a submarine to attack a merchant vessel, as laid down in Article 1, above, is it legal for air craft to do so?

China

"Never prophesy unless you are sure" holds today the same as when first uttered and "I told you so" is in bad taste, but to those acquainted with the Chinese and the underlying conditions in the Far East as they have been developing for the past ten years, the present state of affairs has not been entirely unexpected.

That present conditions in China are not due entirely to the so-called awakening of a slumbering giant is the opinion of many well informed persons despite the many references to a growing nationalistic spirit. There is no doubt that the so-called student class has stirred up many thousands—hundreds of thousands—and that there is a growing

feeling against the foreigner, as exemplified by the slogan "China for the Chinese." This hatred for the foreigner was just as strong nearly thirty years ago and had it not been for the firm concerted stand of the Powers then the situation at that time would have been hopeless so far as affording protection to the foreigner was concerned.

Today the Powers are not acting in concert as they did in 1900, and the Chinese of all factions are perfectly aware of it. The political and economic reasons underlying the policies of the nine Powers in the Far East today are well known, if not always publicly stated, and all the warring Chinese factions, while failing as among themselves to apply the principles of "united we stand, divided we fall," nevertheless are aware of the division of interests among the foreign powers.

One need not be a prophet to state that a display of firmness, backed by force will be always necessary in the face of lawlessness and disorder. Even in civilized America—in the center of our cultured New England— one recalls what happened overnight when the police force of Boston went on a strike.

We are all prone to speak of the influences of civilization on mankind, how human nature has changed, and how intellect and reason have taken charge. *Has* human nature changed? If so, why does one see every few minutes of the day, going down and up Fifth Avenue in New York, heavily armored cars with armed guards inside peeping through the rifle ports of the turrets? Remove these guards and armored cars, remove the police, remove the state national guard, and finally remove the federal forces, and how long would human nature take to demonstrate it had *not* greatly changed? Would we not have to begin all over again?

There are many experts on China, and they all have their reasons for explaining her past, her present, and her future. Some will tell us that China is the proverbial sleeping giant and that once she awakes she will be a powerful nation like Japan; that the cause of her awakening will be western education and the adoption of western methods. Others tell us communications are the present stumbling block—that once China has railroads, telegraphs, telephones, radio, newspapers, books, etc., *then* will come the awakening and realization of her latent power.

Others tell us that the new alphabet will bring about the change; that the people throughout her entire area can then read and converse in the same language, and with communications thoroughly established there will be unanimity of thought and expression and that the Chinamen in Peking, Canton, and in far western Tibet will be just as nationalistic and familiar with one another's views as are the Americans each morning as they read the newspapers whether in Boston or San Diego.

Still others love to tell us it is a case of blood, of race, of heredity—the "Rising tide of Color," so to speak.

Then there are the disciples of environment and of Christianizing influences.

Another view advanced is the effect of geography. This viewpoint expresses the belief, in its conclusions at least, that the case of China is helpless; that geography has forever set its limitations upon the Chinese, and leaders as we know them cannot be developed.

We wonder if the missionaries during the past two years have not been strongly sympathetic with the so-called nationalistic movement? Perhaps they have placed themselves on record in communications to their home churches, for the latter do not seem to be protesting very much against the expulsion of the former.

If the Cantonese Army starts northward for Pekin, it would not be surprising to see the expedition result in another "Napoleon to Moscow" fiasco; nor would it be surprising to see the Cantonese split into a number of factions, fighting each other, before the present movement is over.

Individually the Chinaman has strong characteristics, but collectively can this race exert a strong influence judged by western standards? Only the future can tell but there are several reasons for thinking the answer is in the negative.

Causes of War

The *Saturday Evening Post* of late has been running some very excellent articles and editorials dealing with subjects of great interest to those of our citizens who are interested in questions of national defense and national policies.

It is the business of the Naval War College to study war and one of the important features of the course are the lectures. This part of the course consists of from two to three lectures per week for eleven months given by lecturers considered to be expects in their respective subjects, and every conceivable point of view is thoroughly gone into and examined. The lectures are considered confidential and the lecturer so informed in order that he may feel perfectly free to speak as he pleases, and the staff and student officers are offered an opportunity after each lecture to query the speaker, in order to draw out additional points. The lecturers are college professors, officials of the State Department, geographers, scientists, historians, lawyers, psychologists, trained journalistic observers, international lawyers, capitalists, travelers, ambassadors, Chinese, etc. The late Samuel Gompers gave a very interesting talk four or five years ago.

One can imagine the voluminous topics and subjects discussed, all bearing on war and the causes of war; and when one does, one wonders at the cocksureness of certain pacifist organizations and their propaganda.

These organizations, as Mr. Buell points out in his article in this issue of the PROCEEDINGS, take advantage of the *emotional* side of man, and through these same emotions attempt to persuade him that reason and intellect should control him. Is the pacifist sincere or illogical? If human nature has changed and man's moral nature has been greatly improved by mental reasoning alone, why the appeal to his emotions? The answer would seem to be that man's emotional side is still his strongest. At least, it still is at the base of love, marriage, the desire to provide food and shelter for himself and family, and to acquire and protect his property; and have not these factors directly and indirectly resulted in our modern civilization, with its complexities of commerce, trade, finance, shipping, etc.?

Would not the brotherhood of man and world peace be sooner attained if the emotional side of man were recognized rather than ignored? Ideals are goals to be striven for, it is true, but in dealing with human beings their *emotional* side cannot be overlooked.

By the City of The Long Sand—A Tale of New China

Today's press despatches (March 29) from China report that all foreigners are evacuating Changsha, China. Those who have read Alice Tisdale Hobart's charming book *By the City of the Long Sand,* a tale of New China, will recognize the title as being descriptive of the Chinese "Changsha," across from which city, on an island, was her "company" home, where the authoress started "upon the seven times seventh bit of homesteading as the wife of a representative of a great American oil company in China."

This book should appeal to many at the present time, whether interested in China or not, but it should be particularly appealing to the naval officer and his wife. It is a most readable and accurate account of the Chinese, their customs, characteristics and life, but the main theme is the story of her personal experiences and of her changing homes—a different one each time her husband was transferred to a new post. This last will give a key as to why naval readers would be so sympathetic.

And strange enough—but is it?—her husband's name was among those injured in Nanking last Thursday when fleeing from Socony Hill and the looting, murderous, Nationalist soldiers, while under the protection of guns of the American and British Navies.

To those who wonder why nationalism is still a part of human nature would do well to ponder Mrs. Hobart's short chapter on "The Miracle of Nationality":

Because I am an American homesteader, I have the power to look within each gray and white city in the green half of China and each brown city of the brown half of China and see the bit of America which trade has hidden in its heart. What is it? "Where two or three are gathered together in my name . . . ."

Thus does the man of trade from England have the vision which sees and creates England, and Frenchmen make visible a bit of France. It matters not that the red and gold signs, the tiled and thatched roofs, the fantastic pagodas, the narrow, walled-in, dirty streets of the East often entirely obscure these mosaics of Main Street built in the image of America, England, France, Germany. This is the miracle of nationality.

Come inland, penetrate with me into almost any one of these dim thousand-year-old cities, so deep that the very products which the man from the West has introduced—oil lamps, leather shoes, and even soap—have lost forever their rightful western look and in some insidious way become Oriental in aspect, and I will show you this miracle of nationality. Into the interior we go until China picturesque and sordid, China effete and primitive, wraps us about, will not let us go, and there I will show you America. America! In seven years this experience has never ceased to thrill me.

Suppose we choose a city in the Yangtse valley, just any city. Come, sitting in sedan chairs upon the shoulders of men, we ride into the city. The East surges around us in great, battering waves of humanity, presses upon us, breaks over us with all but intolerable, naked meaning of life. From the windowless huts which border the tunnel-like streets China's millions belch forth—spawn produced by animals careless and wasteful of the individual. Through mean furtive streets after mean furtive streets we ride. The cavish buildings draw closer, shut out the air, the sky, spill forth the encumbrances, the filth of too much living. Upon your sensibilities there impinges with ugly insistence the business of being born, getting food into bellies, dying. On your ear-drums beat the guttural sounds of men eating with the ravenous haste of animals, the squeals of pigs, the growls of wolfish dogs, the grunts of pack animals in the thin disguise of men. Your nostrils contract against the reek of rancid oil being thrown into hot and unclean pans, mingling with the smell of raw animal flesh overlaid with the odors of rotting garbage and the thick odor of joss burning to gilded gods who hear not the cry of the millions. To your ears comes the wail of unnumbered infants not yet tamed to pain, to your nostrils the reek of the sewage and decaying fish. Deeper! Deeper! into the tunneled streets where there is no time for pity or cleanliness or beauty in this city where the unborn generations hurry upon the heels of today's millions. The ordered ways of the West are blotted from your mind. Only the ruthless sights, sounds, smells of the overstocked East remain. Dulled, beaten, stunned, you sit there on the shoulders of men who sweat, shout, swear their way into the seething streets.

A louder shout. A gate opens in a high wall. Lo! your chair is set down in America! The Main Street that has been made a satire and a reproach looks like heaven to you. Spacious green lawns, such as you have always looked out upon in Illinois or Rhode Island, lie all around you. You look only into the deep recesses of quiet verandas. With what relief you behold the doors of the houses guarding with common reticence the intimate functions of existence.

What matters it that as we sit at luncheon, albeit it is now called "tiffin," surrounded by the amenities of a western meal—white table linen to look upon, the bland tinkle of glass and silver in our ears, dainty food to eat without haste—there beats through the dining-room the harsh cries of Oriental beggars, the wail of funeral drums, the throb of temple gongs? *Mascee.* So, too, to the yellow

man in Pell Street, New York or Chinatown, San Francisco, there comes the clang of trolleys, the honk of motors as he sits over his chopsticks and bowl of rice. This is the miracle of nationality. He sits in China though in America. We sit in America though in China. It matters not that the shadow of a Buddhist temple falls across my green western lawn and my tennis court. So, too, may the shadow of a church fall across the Chinese threshold in America. It is only a shadow. It does not matter. These hidden towns of five or twenty-five or a hundred Americans belong to America as much as the villages of Iowa or Massachusetts. "Where two or three are gathered together in my name . . . ."

You may smile over these Cinderella Main Streets, our little western towns thrown helter-skelter among the markets and temples of Asia, but be merciful to them. As I draw away the veil from these hidden bits of America, remember that like Tinker Bell they will not have the vitality to live unless you believe in them.

A naval salute to two governors in less than twenty-four hours

Commander Kay's article on "The Naval Battle of Topolobampo, 1914," in last month's issue of the PROCEEDINGS, recalls to mind the Secretary's days on the west coast of Mexico in 1913, during the "misunderstanding" with Mexico. At that time, practically all of the west coast and north portion of Mexico were in the hands of the Carranzistas, with the exception of the ports of Guaymas in Sonora and Mazatlan in Sinaloa, the latter two being in possession of President Huerta. The American commander-in-chief was on friendly personal terms with the Huerta governor, General Rasgado, in the city of Mazatlan (Sinaloa), and every time the former's flagship came into that port he would fire a personal salute of seventeen guns to the governor. The commander-in-chief was also on friendly personal terms with the Carranza governor of Sinaloa, Governor Riveros, at the capital Culiacan, some hundred miles inland from the coast, and on the Southern Pacific of Mexico railroad. After having received several very cordial messages from the so-called rebel governor of Sinaloa for himself and staff to visit Culiacan, the commander-in-chief accepted, the flagship proceeded to Topolobampo, (Topolo is an Indian word for tiger, and bampo is the word for water) so named, legend has it, from the fact that tigers used to come to that locality for water.

Topolobampo was the southern terminus and gulf port of the old Kansas City Oriente and Mexico Railroad, which crossed the Southern Pacific of Mexico at a point called San Blas, near the large sugar and tomato plantation of the United Sugar Company. The commander-in-chief proceeded to San Blas from Topolobampo, being met by a special train and General Obregon's chief of staff and personal representative of Governor Riveros, who escorted the party to Culiacan, where lavish entertainment awaited them. At the end of this visit Governor Riveros and staff accompanied the commander-in-chief by rail directly to the gulf coast village of Altata, off which port the flagship was anchored, the latter having run down the Gulf of Lower California from Topolobampo.

After a short visit and inspection of the ship, and having been entertained with champagne refreshments, the so-called *rebel* governor and his party left the ship about four o'clock in the afternoon. Upon this departure a personal salute of seventeen guns was fired, the Mexican national ensign being at the fore truck. The flagship was back in Mazatlan the next morning. The commander-in-chief paid his usual visit of courtesy to the *federal* governor there and a little later the latter returned the visit. Upon his departure he was likewise saluted with a personal salute of seventeen guns.

This is believed to be the only instance on record of two governors of the same state being saluted by the same foreign flag officer in less than twenty-four hours. It will

be remembered, of course, that the American government recognized neither the Huerta or the Carranza Governments at this time, and treated both factions as *de facto* governments.

An interesting story in connection with this is that Governor Riveros (Carranza) was duly elected as governor of the State of Sinaloa at the time of Madero's election, and that at the beginning of the revolution (1911) had been invited to Mazatlan to attend a banquet, and had been made prisoner and taken to the penitentiary in Mexico City, from which he had escaped and made his way back to Sinaloa by way of the United States. He was therefore the duly elected governor. On the other hand, the governor at Mazatlan in 1913 had been the duly appointed representative of President Huerta, and thus the anomaly was presented of two governors of the same state at the same time, both of whom were recognized *personally* by an American flag officer.

Three Captains of the Same Ship

Topolobampo recalls other memories of the strange case of the three captains of the same ship. In 1913, it will be recalled, Secretary of State Bryan warned all American citizens to get out of Mexico as soon as possible, and offered steerage passage to each of our citizens who would take oath before an U.S. consul that he was destitute and could not buy a passage. He (she) was also required to pay back the advanced passage money if he could at some future date. (President Huerta offered better terms, agreeing to advance first class passage money, no oaths required, no money back.)

Officers on the west coast at the time remember the Paul Revere like ride of the State Department's messenger through the Yaqui Valley, and how men, women, and children dropped their plows and left their horses in the fields. Some did not stop to get their clothing from their homes. Upon arriving in California some 110 of them were virtually clotheless, and moneyless and dependent upon charity.

To get the remainder out of the west coast of Mexico an Army transport was put in commission at San Francisco, and she arrived at Topolobampo with a sailing-master captain, the regular Army Quartermaster captain, and lo and behold, she had on board a State Department captain, the latter a personal representative of Mr. Bryan.

At Topolobampo things began to happen this wise. An American cruiser had on board several hundred thousands of dollars worth of silver bullion bars which had been brought overland to the coast by American mining interests from the state of Durango. The company had paid the legal export tax to the Carranzistas (so-called rebels) and the legal import tax to the State of Sinaloa, and was also ready to pay a further export tax from Topolobampo (in Carranzista control) as soon as transportation could be arranged to bring the bullion to San Francisco.

The company representative, the Carranzista officials, and the commanding officer of the American cruiser all tried without success to turn the bullion over to the transport; all three captains would have nothing to do with it, hinting it was contrary to international law. It was finally explained to them that this was a regular procedure, that the United States recognized both Carranza and Huerta as being heads of *de facto* governments, and as all legal requirements as to taxes had been met it was legal to receive the silver bullion. *Finally,* it was explained that the captain of the transport was *entitled* to a *very large* and *handsome* fee, entirely legal to accept, for safely transporting the bullion to San Francisco.

This complicated matters and brought up the question as to "When is a captain a captain?" There were several hours of hot debate, the result of which is not known, but fi-

nally the State Department captain sent a radio to Washington, asking if the Navy captain was right in his interpretation of international law, and upon being answered in the affirmative the bullion was taken aboard.

It is not known whether or not the legal fee for safeguarding and transporting the bullion was divided, like all of Gaul, into three parts.

The New "Proceedings"

The Secretary is in receipt of so many letters regarding the new and enlarged PROCEEDINGS that he finds it impossible to reply individually, and takes this opportunity to acknowledge their receipt and is grateful for the many helpful suggestions and constructive criticisms he and the Board of Control have received.

There has been no lowering of the general high character of the articles published since the first of January, as some feared if an attempt should be made to make our magazine more attractive to the general public. An attempt *has* been made, however, to have *timely* articles and *timely* and interesting illustrations. For example, the April number had three articles on China, all of which should have been particularly interesting to the lay reader as well as to the naval officer.

The articles in the PROCEEDINGS should appeal to many readers in civil life today, whereas ten or fifteen years ago they would not. The reasons are these: (*a*) Today there are some eighteen to twenty odd million people who are interested in the internal combustion engine (automobiles) whereas formerly there were comparatively few. Hence, this form of engineering is as generally familiar now to them as it was to the engineering profession years ago; (*b*) the same remarks apply to motor boating. A few weeks ago 20,000 people attended the Motor Boat Show in the Grand Central Palace in three days, and most of them were enthusiastic owners of licensed boats, familiar with the Rules of the Road, engines, and motor boat seamanship; (*c*) there are some five to ten millions of our citizens interested in radio, whereas a few years ago only the Army, Navy, and commercial radio companies knew or cared about this subject; (*d*) the World War and the questions arising therefrom have interested hundreds of thousands of our citizens in foreign affairs, international relations, and national policies, whereas a few years ago these subjects were of interest to but a small percentage of our people; (*e*) the movies have also contributed to the general education of our people in that scenes from foreign countries have been brought home to them, thus accentuating interest in travel. Witness the greatly increased number of foreign travel cruises being made today.

In other words, the American citizen today has been educated to the extent where articles on ships, small boats, the Navy, navigation, engineering, radio, foreign affairs, travel, history, etc., are interesting to him. Why not take advantage of this fact to present the same character of articles the PROCEEDINGS has always had, but to do so in an as attractive and interesting form as possible.

In other words every human being sub-consciously perhaps longs for travel, adventure and romance; these repressions find one outlet in certain kinds of reading.

In the February number of *World's Work*, for example, there appeared an illustrated article by a naval aviator, Lieutenant Ben H. Wyatt, entitled "The Aviator Maps Our Last Frontier." Had this been published in the PROCEEDINGS a few years ago and without illustrations the average reader would have probably passed it by with the remark "high-brow-stuff," and yet it was eagerly read by thousands and thousands of *World's Work* readers.

The Editor believes that a worth while percentage of the American public today is sufficiently educated and interested to appreciate and enjoy a certain amount of the material appearing each month in the PROCEEDINGS, and this too without in any way lowering the standard of the general character of the articles printed.

All high class magazines today contain a certain number of technical articles, as will be disclosed if one takes the trouble to make an investigation.

The Man-of-War's Man's Manual

The *Seaman's Handbook, U.S. Navy, 1921,* has recently been revised by Rear Admiral R. R. Belknap, U.S. Navy, (Retired), Commandant of the Naval Training Station, Hampton Roads, Virginia, and brought thoroughly up to date, so that it will be in agreement as to facts with the four official drill books of the Navy Department, which are also being revised at this time.

This book is considered by many to be very desirable for the instruction of recruits at training stations, and before the latter join their ships in the fleet.

As this book is particularly useful in the training of *all* recruits for service aboard naval craft, the Naval Institute, acting upon the advice of the reviser, has decided to change the name to *The Man-of-War's Man's Manual.* The price of the book will be the same as formerly, viz., 65 cents, postpaid.

Naval Institute to publish General von Sanders' "Five Years in Turkey"

The Naval Institute has arranged with General Liman von Sanders for the American rights to translate and publish his book, *Five Years in Turkey.* The translation will be by Colonel Carl Reichmann, U.S. Army. This book should afford English readers a further opportunity to learn of the operations of the Turkish Army during the World War, and particularly of the campaign in the Dardanelles from the German and Turkish viewpoints where General von Sanders was in supreme command against General, Sir Ian Hamilton. The book will consist of approximately 330 pages and three maps. The price, postpaid, will be $3.50. An attempt will be made to have the book off the press by July 1.

Federal Radio Commissioners

In accordance with the new law recently passed by Congress, President Coolidge has appointed Federal Radio Commissioners to regulate radio broadcasting. The chairman of this board, appointed for six years, is one of the Institute's oldest members, Rear Admiral W. H. G. Bullard, U.S. Navy (Retired). Admiral Bullard has long been known as an electrical expert in the Navy and was its first Director of Communications. So well did he do his work before and during the World War that it was the Navy Communication system that President Wilson and our State Department relied upon at the Peace Conference at Versailles.

Admiral Bullard is the author of *Naval Electricians' Textbook,* Volumes I (Theoretical) and II (Practical), still the standard textbook for the instruction of midshipmen at the Naval Academy in the Department of Electrical Engineering and Physics, and of ships' libraries. It is published by the Naval Institute.

Photographs and Illustrations

The Editor again calls attention of our readers to the desirability of sending to us selected photos of subjects suitable for reproduction in the PROCEEDINGS. The general character of photos desired can best be determined perhaps by a reference to those published in the last five issues of the PROCEEDINGS.

The Editor is planning for June a Naval Academy edition, so far as the special illu trations are concerned. These will be of particular interest to the service at large as w as to our civilian associate membership. Other numbers planned will contain illustratio of Japan, the Philippines, and Hawaii.

The Editor would be pleas d to receive photos of subjects in the Virgin Islands, Panam Nicaragua, Mexico, Guam, Samoa, and Alaska, as well as from all forces oper ing in the Mediterranean, Central American waters, etc. In fact, naval officers are for nately situated to take photos of many interesting subjects.

The Institute will pay for the photos selected.

The Line of Position Book

The Secretary is informed that Lieutenant Commander Weems propos to publish a book based on the methods described in his article publish elsewhere in this issue. He says, "Its contents will be restricted to t tables and explanations necessary for the solution of the line of positi under all conditions. For an explanation of the mathematics involved, a for other details of the method, reference will be made to the article."

He proposes to "have the book bound in a flexible water-proof binding, its dimensio to be approximately those of the *Nautical Almanac,* so that it will fit the coat pock and a separate additional azimuth diagram on one sheet, mounted on a folding cardboa will be gotten out for those who work in constricted spaces."

Lieutenant Commander Weems further states that the contents of the book will be:

Page	Subject
1	Time to arc conversion table and star altitude correction table
2	Sun altitude correction table
3- 4	Moon altitude correction table
5- 7	Explanation of tables and typical problems.
8-34	Altitude tables
35-36	Left portion of azimuth diagram
37-38	Right portion of azimuth diagram
39-40	Aviator's Speed-Time-Distance table, and course correction table. For all latitudes up to 65 grees, this handy book of about 44 pages, together with the nautical almanac, will provide *data necessary for the working of lines of position under all conditions.*

No information is available at this time as to where or how soon the book and sep rate azimuth diagram will be published.